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Institut Català de Recerca per a la Governança del Mar

State of fisheries in Catalonia 2021, Part 1:

Report on the monitoring of the commercial fishing fleet

Generalitat de Catalunya
Departament d'Acció Climàtica, Alimentació i Agenda Rural

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This report presents the state of fisheries in Catalonia in 2021. Section 1 describes the results of the monitoring of the commercial fishing fleet throughout the year, Section 2 describes the changes and updates made to the information systems and data analysis structures, and Section 3 analyzes the temporal and spatial structure of bottom trawling fishery *métiers* in Catalonia.

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Glossary

CL: Cephalotorax Length

CPUE: Catch Per Unit Effort

GFCM: General Fisheries Commission for the Mediterranean

GSA: Geographical Sub-Area

GSI: gonadosomatic index

GT: Gross Tonnage

LF: Length Frequency

LPUE: Landing Per Unit Effort

MAP: Multi-Annual Plan

MCRS: Minimum Conservation Reference Size

MCRW: Minimum Conservation Reference Weight

OTB: Bottom Otter Trawl

PCA: Principal Component Analysis

PSA: Productivity and Susceptibility Analysis

STECF: Technical and Economic Committee for Fisheries

TL: Total Length

VL: Vessel Length

VMS: Vessel Monitoring System

WF: Weight Frequency

WMS: Geoserver a Web Map Service

Executive summary

This report presents the state of fisheries in Catalonia in 2021. Section 1 describes the results of the monitoring of the commercial fishing fleet throughout the year, Section 2 describes the changes and updates made to the information systems and data analysis structures, and Section 3 analyzes the temporal and spatial structure of bottom trawling fishery *métiers* in Catalonia.

Section 1 - Biological and fishery monitoring

The sampling procedures varied depending on the species studied and the fishing gears used. The main results are reported by fishing modality and then categorized by species.

Bottom trawling

In 2021, 66% of the total catch corresponded to landed species, while 27% was discarded. Organic debris and marine litter represented 6% of the catch. A total of 339 different species were identified in our samples, 150 of them belonging to the commercial fraction of the catch and 306 to the discarded fraction - some species show up in both fractions. When analyzing the results by depth, the lower slope presented the highest percentage of landed catch (71%) whereas the continental shelf had the lowest (57%).

The commercial species monitored in bottom trawling were the hake (*Merluccius merluccius*), the Norway lobster (*Nephrops norvegicus*), the blue and red shrimp (*Aristeus antennatus*), the horned octopus (*Eledone cirrhosa*), the spottail mantis shrimp (*Squilla mantis*), and the caramote prawn (*Penaeus kerathurus*). Species distribution maps, length frequency distribution graphs, length-weight relationship parameters, and gonadal cycle graphs representing the gonadosomatic index (GSI) are presented for each species. The GSI values in crustaceans are only presented for females, since males present stable GSI values throughout the year.

Within the commercial species, each depth had a different composition, with *Squilla mantis*, *Trachurus trachurus*, *Phycis blennoides*, and *Aristeus antennatus* being the most abundant species in the shallow continental shelf, continental shelf, upper slope and lower slope, respectively. As for the discarded species, *Engraulis encrasicolus* and *Leptometra phalangium* were the most abundant species in the shallow continental shelf and continental shelf, respectively. In both slopes, the most abundant discarded species was *Scyliorhinus canicula*. Considering the debris fraction, the most abundant elements had a terrestrial origin in all depths.

Data on catch composition for the bottom trawling fishery are presented by port for the 9 ports sampled: Roses, Palamós, Blanes, Arenys de Mar, Barcelona, Vilanova i la Geltrú, Tarragona, L'Ametlla de Mar, and La Ràpita.

Purse seine fishing

A total of 76 samplings were carried out for purse seine fishing in 2021. Both target species - the European sardine (*Sardina pilchardus*) and the anchovy (*Engraulis encrasicolus*) - presented no variations in their length frequency distributions throughout the years studied (2019 to 2021). For the European sardine, in 2021 there was a larger proportion of caught individuals below the size at first maturity, defined at 10.5 cm by the latest study available in our area (Albo et al. 2021), and also below the minimum conservation reference size (MCRS), established at 11 cm, representing immature and small-sized individuals that had not yet bred. For the anchovy, this is observed in 2020 (size at first maturity is 9.6 cm according to Albo et al. 2021, while MCRS is 9 cm).

Species distribution maps, length frequency distribution graphs, length-weight relationship parameters, and gonadal cycle graphs representing the gonadosomatic index (GSI) are presented for each species. The reproductive period of the European sardine was observed from October to April, with a peak in December for both sexes. For anchovy, the reproductive period was observed from April to October, with a peak from May to July for both sexes.

Small-scale fisheries

The monitoring of small-scale fisheries includes the sand eel fishery, which focuses on the Mediterranean sand eel (*Gymnammodytes cicerelus*), the smooth sand eel (*Gymnammodytes semisquamatus*), and the transparent goby (*Aphia minuta*), and the common octopus fishery, which targets *Octopus vulgaris* with both pots and traps. The sand eel fishery is the subject of a co-management plan, in place since 2014. The common octopus fishery is also co-managed in two different areas of the territory: Central Catalonia and the Ebre Delta. Results are presented for all of Catalonia and then by zone.

Section 2 - Information systems and data analysis

The main technologies used and conceptualization of ICATMAR information systems have been described in previous reports (ICATMAR, 2021-02). The present report refers only to the last upgrades implemented. The changes affect data input, storage, processing, and visualization.

Data input

A system has been developed to allow data input autonomously by each sampler, implementing automatic data checks to reduce errors in data stored in databases and perform automatic calculations to ease the data analysis. In all samplings on board and in the laboratory,

data are collected in sampling forms and entered in the data input website in order to centralize information, improve quality, relate data concepts and perform their corresponding calculations. Updates to the website and database have been implemented to allow for data entry from fishing modalities other than bottom trawling, i.e. purse seine and small-scale fisheries.

The sampling data entered into the database through the input website are combined with different sets of external data, i.e Vessel Monitoring System (VMS) geolocation data, landings data, and fleet register datasets. The database and input website have also been adapted to host data from other projects besides our commercial fishing fleet monitoring program, such as studies on fishing gear selectivity or data collection for co-management plans.

Data storage

The data check protocols and structure have been adapted to the different fishing gears used. The current database contents include 941 fishing hauls, 2 800 positions, and 270 000 specimens measured.

Data processing

Different procedures have improved the data analysis. First, VMS data are now interpolated by means of a Cubic Hermite Spline interpolation method developed by Russo et al. (2011), using vmsBase R package (Russo et al., 2014). Then, standardization and extrapolation of the data has been made easier by implementing a number of automatic calculations directly into the data input website, including frequency (in number of individuals, ind.), abundance (ind./km2), total weight (g), and biomass (kg/km2).

Data visualization

As for data visualization, the output for geographic products, charts and tables has been automated using QGIS and R directly connected to the database. More data visualization products include a web architecture, which has been designed to improve the scientific knowledge transfer to different stakeholders. A new website will be developed to provide information on the institution, services, team, publishing reports, and related news. The new website will also host two data viewers, one intended for the general public and one geared towards the scientific community. The general viewer aims to provide access to all stakeholders publicly. There is currently a prototype developed in collaboration with Xarxa Maritima de Catalunya containing the sampling data for trawling fisheries. The scientific viewer aims to give access to all available ICATMAR datasets, either geographic or not, to a variety of users with previously approved authorisation. The system allows publishing layers stored in ICATMAR databases or static datasets, each layer containing its metadata, specific styles and attributes. The technologies used will be Geoserver and Geonode, a Django based website that allows users management.

Section 3 - Temporal persistence and spatial differentiation of the bottom trawling fishery *métiers*

This section focuses on five species that are subject to management measures and periodically evaluated in the geographical subarea 6 (GSA 6, NW Mediterranean, as defined by the General Fisheries Commission for the Mediterranean): the hake (*Merluccius merluccius*), the red mullet (*Mullus barbatus*), the blue and red shrimp (*Aristeus antennatus*), the Norway lobster (*Nephrops norvegicus*), and the deep-water red shrimp (*Parapenaeus longirostris*). The analysis is conducted following the four distinct bathymetric ranges of the Catalan coast (northern half of the GSA06): the coastal shelf (25–100 m), the deep shelf (101–200 m), the upper slope (201–500 m), and the lower slope (501–800 m).

To account for heterogeneity in fishing practices, the European Common Fisheries Policy recognizes the importance of a métier-based sampling. A *métier* is defined as a group of fishing operations that aim for a similar group of species using similar fishing gear during the same period and / or in the same area and with a similar pattern of exploitation. Then, considering the characteristics of the NW Mediterranean trawl fishery, and the current legislative framework, two main objectives have been defined for the present work:

- Define a protocol to identify *métier*s along with their temporal and geographical evolution;
- Characterize the bottom otter trawl (OTB) fleet by *métier* considering four facts: main target species, by-catch harvested community, temporal persistence, and spatial deployment.

Métiers identification by port

A PCA analysis indicates that 45% of the variability is caused by the species composition of the catch, which determines a difference between the composition of the shelf *métiers* (OTB1, OTB1A, OTB1B, OTB2, OTB2A, OTB2B) and the slope métiers (OTB3, OTB4). The ports from the north and the center of the Catalan coast present two shelf *métiers* (OTB1- OTB2) and two slope *métiers* (OTB3-OTB4) whereas most ports from the south zone present four shelf *métier*s, two from coastal shelf (OTB1A, OTB1B) and two from deep shelf (OTB2A, OTB2B).

When studying the species that drive the different métiers, several differences were observed. For example, the red shrimp was the only species highlighted in the PCA analysis for the lower slope *métier* (OTB4). Moreover, métiers varied among them and among years, but not among the interaction *métier*s and years, indicating a *métier* consistency during the time series.

Temporal persistence by port and by *métier*

The species composition of each *métier* varied very slightly according to zones. For example, the species that were landed the most on the north, central and south coastal shelves was the red mullet (*Mullus* spp.).

The amount of trips made by fishing vessels grouped in different Vessel Length (VL) categories in each *métier* varied according to zone. As an example, VL from 18 to 40 m accumulated most fishing trips in the north whereas in the center and south most trips were done by 12-18 m VL.

The number of vessels fishing in each *métier* decreased throughout time, which aligns with the reduction in the Catalan trawler fleet in the last 20 years, where the total number of vessels decreased by 42% since 2000.

There were changes in Landing Per Unit Effort (LPUE) in each *métier* throughout the time series (2002-2021). For example, platform *métier*s (OTB1, OTB2, OTB1A, OTB1B, OTB2A and OTB2B) had a higher LPUE than upper and lower slope *métier*s (OTB3 and OTB4).

Spatial differentiation by métiers using VMS data

VMS data was used to spatially differentiate the fishing ground of each *métier* at the port level.

SECTION 1

Biological and fishery monitoring

Introduction

The Mediterranean Sea is an area with long-established oceanographic and fishing traditions. The exploitation of marine living resources started thousands of years ago becoming an area of observations and descriptions in which fishing has always been of main importance (Margalef, 1989). Within the Mediterranean Sea, fisheries activities are deeply rooted in the Catalan culture and have historically been the main source of income and identity for its coastal communities. However, to ensure future provision of marine resources, there's a need to develop science-based management strategies and implement monitoring programs. For this purpose, the Catalan Research Institute for the Governance of the Sea (ICATMAR) was created in Catalonia in 2018 as a cooperation body between the General Directorate of Fisheries and Maritime Affairs and the Institute of Marine Sciences (ICM-CSIC). Its aim is to develop the program of the Maritime Strategy of Catalonia, which bases the governance of the maritime policies of the territory on scientific data, long-term monitoring, and the model of co-management.

Method

Based on their importance in terms of catch and economic value, the target species of the biological sampling are hake (*Merluccius merluccius*), Norway lobster (*Nephrops norvegicus*), blue and red shrimp (*Aristeus antennatus*), horned octopus (*Eledone cirrhosa*), spottail mantis shrimp (*Squilla mantis*), caramote prawn (*Penaeus kerathurus*), common octopus (*Octopus vulgaris*), European pilchard (*Sardina pilchardus*), European anchovy (*Engraulis encrasicolus*) and the sand eels (as it is mandatory to monitor them within the framework of the "sonsera" Management Plan) including Mediterranean sand eel (*Gymnammodytes cicerelus*), smooth sand eel (*G. semisquamatus*) and transparent goby (*Aphia minuta*).

The sampling procedures varied depending on the species studied and the fishing modality used to catch them. An overview of the total sampling trips in the three fishing modalities during the year 2021 is shown in Figure 1.

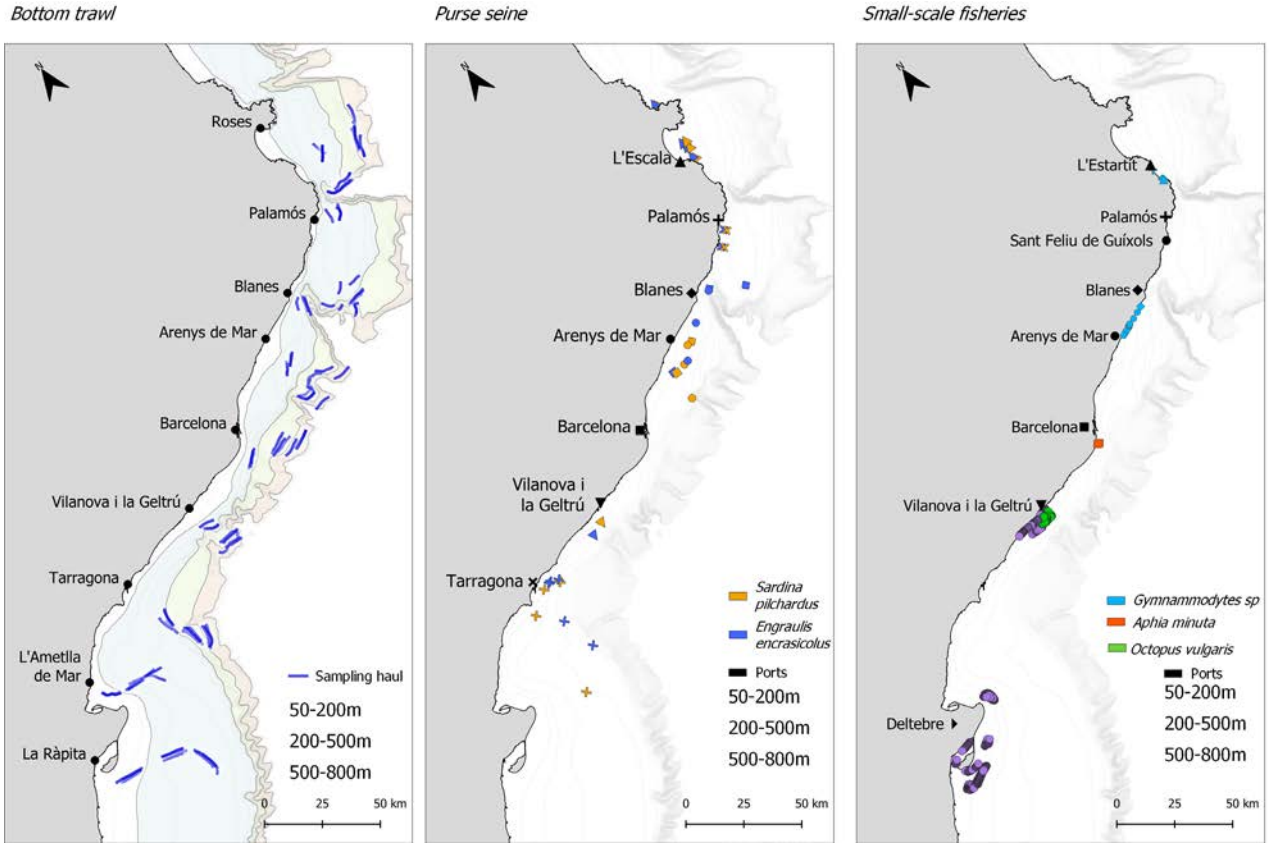


Figure 1. Fisheries monitoring sampling conducted in Catalonia in 2021.

Bottom trawling sampling

For bottom trawlers, sampling was done through experimental hauls at different depths, in fishing grounds defined by high-fishing effort areas (Sala-Coromina et al., in prep.).

Sampling was carried out from 9 main commercial ports, with a quarterly frequency per port. The division of the study area in 3 zones (North, Center and Ebre Delta) is made according to both hydrographic and geomorphological traits of the continental shelf (Clavel-Henry et al., 2021). The ports of the zones where the sampling took place are:

- North zone: Roses, Palamós, Blanes, and Arenys de Mar.
- Center zone: Barcelona, Vilanova i la Geltrú and Tarragona.
- Ebre Delta zone: L'Ametlla de Mar and La Ràpita (formerly Sant Carles de la Ràpita).

Each sampling day includes three experimental hauls on board of the same vessel, each one at a different depth range. Each haul is GPS-recorded with a start and end point, fishing time and gear width. These measurements allow the calculation of the swept area to standardize species biomass and abundance values. The sampled depth ranges for the Northern and Central zones and their corresponding most common target species are:

- Continental shelf (76 – 200 m): hake, horned octopus, caramote prawn and spottail mantis shrimp.
- Upper slope (201 – 500 m): Norway lobster, hake and horned octopus.
- Lower slope (501 – 800 m): blue and red shrimp.

However, for the Ebre Delta zone the sampled depth differs due to the distinct geomorphological structure of the Ebre Delta, where commercial fishing activity takes place exclusively in the wide continental shelf, and thus requires a more detailed sampling of this area. The sampled depth ranges for the Ebre Delta zone and their most common corresponding target species are:

- Shallow continental shelf (<40 m): spottail mantis shrimp and caramote prawn.
- Middle continental shelf (40 – 75 m): spottail mantis shrimp and hake.
- Continental shelf (76 – 200 m): spottail mantis shrimp and hake.

For the analysis of length and weight frequency distributions (LF and WF, respectively) of the target species, the shallow and middle continental shelves of the Ebre Delta zone have been unified under the name of shallow continental shelf and cover a depth range from <40 – 75 m.

Average depth for each haul is then estimated by calculating an average point between the start and end points of each haul. Mesh size is 40-mm square for all hauls except in Palamós lower slope, where the co-management measures for the blue and red shrimp fishery require a 50-mm squared mesh.

On board, the fishermen sort the catch into two categories: commercial, i.e. individuals of commercial species to be sold in the fish auction, and discard, which can include individuals of non-commercial species and/or undersized or damaged individuals of commercial species, as well as marine litter and natural debris. Fish, crustacean and cephalopod individuals of the commercial fraction are identified and measured on board (total length, cephalothorax length and mantle length, respectively). For the target species, a subsample of a little over 30 individuals is preserved in coolers to transport to the laboratory. As for the discard fraction, either the total sample or a subsample – depending on the total size of the catch – is preserved in coolers and transported to the laboratory for further analysis. The process is repeated for each of the three hauls.

Once in the laboratory, at the ICM-CSIC, the target species individuals were measured, sexed and weighed individually, their reproductive stage was assessed and their gonads weighed.

Debris definition and composition

The samples used to characterize and analyze the debris and its composition, were obtained from the discard fraction gathered during the bottom trawling sampling.

The term debris includes two different types of items. On one side, the non-organic materials caught during fishing operations, also known as marine litter and, on the other, organic materials with terrestrial and marine origin such as shells, algae and plants. Debris have been classified following (REGULATION (EU) 2022/92) (Table 1).

For the analysis and plots of the debris, the categories analyzed were the 10 with the highest weight and representing over 2% of the total catch.

Table 1. Classification of marine litter.

Category	Subcategory	Description
Metal	Metal	Items or pieces made with metal, i.e. cans, lids
Plastic	Fishing gear	Plastic fishing related items, i.e. nets, buoys, line
	Plastic	Items or pieces made with plastic, i.e. bags, containers
	Sanitary waste	Personal hygiene and health related items, i.e. face masks, gloves, tampons, blisters
	Wet wipes	Single use moistened pieces of non-woven fabric
Rubber	Rubber	Items or pieces made with rubber, i.e. ballons, boots, tyres
Textile	Textiles	Clothes and pieces of fabric
Wood	Wood	Items and pieces made with wood, i.e. corks, boxes or poles
Other waste	Clinker	Burned coal from steam ships
	Glass	Items or pieces made with glass, i.e. cups, jars
	Unclassified waste	All other marine litter which does not fit in the specific categories

Purse seine fishing sampling

For the purse seine fishing, sampling was done through the acquisition of batches of European pilchard and European anchovy. A defined quantity of the catch was bought directly at the sampled port market, therefore, the fishing trips were not experimental but strictly planned by the vessel skippers according to their own interests.

Batches were purchased from 7 main commercial ports: L'Escala, Palamós, Blanes, Arenys de Mar, Barcelona, Vilanova i la Geltrú and Tarragona. No batches were acquired in the Ebre Delta zone since no significant catch of these species lands in ports south of Tarragona.

One batch from the port of l'Escala and one from the port of Tarragona were purchased on a monthly basis and one or two additional batches from other ports. Data on the batch origin

(vessel, catch coordinates and total catch) were gathered at the fish market or from the fisherman who provided it.

Once in the laboratory, at the ICM-CSIC, all the individuals from a subsample of approximately 3 kg from each of the target species - when both were available - were measured to the nearest 0.5 cm and classified by size categories to obtain size frequencies. Then, 30 individuals from each species, distributed by all size categories, were measured and weighed individually, their reproductive state was assessed and their gonads weighed. If discard species were present in the batches, they were identified and their individuals measured and weighted.

Small-scale fisheries sampling

Small-scale fisheries samplings include the sand eel fishery and the common octopus fishery.

Sand eel fishery sampling

For the sand eel fishery, sampling was carried out on board boat seine ("*sonsera*") fishing vessels where biological batches were obtained. As in the purse seine fishing sampling, the fishing trips were not experimental but strictly planned by the vessel skippers according to their own interests. During closure periods, one sampling per month was carried out to check the state of the population before the opening of the fishery.

Sampling for the Mediterranean and the smooth sand eel was carried out from the ports of l'Estartit, Sant Feliu de Guíxols, Palamós and Blanes, in the province of Girona, and from the port of Arenys de Mar, in the province of Barcelona. On the other hand, sampling for the transparent goby was carried out from the ports of Barcelona and Badalona.

Two monthly samplings were conducted where biological batches of 1 Kg of Mediterranean and smooth sand eel were obtained: one from the port of Arenys de Mar and the other from one of the ports in the province of Girona. Batches were preserved in coolers to transport to the laboratory. When transparent goby was available, two monthly batches of 1 Kg were obtained from the ports of Barcelona and Badalona (one from each location).

Once in the laboratory, at the ICM-CSIC, a random subsample of 100-200 individuals was classified by species (either Mediterranean or smooth sand eel), measured to the nearest 0.5 cm, and classified by size categories to obtain size frequencies. Then, 50 individuals, distributed by all size categories, were measured and weighed individually, and, for the ones with a length above 6 cm, their reproductive state was assessed. If discard species were present, they were identified and their individuals measured and weighted. For the transparent goby, the same protocol was followed.

Common octopus fishery sampling

For the common octopus fishery, sampling was carried out on board fishing vessels, using pots and traps as fishing gears, where biological batches were obtained. As in the purse seine fishing and the sand eel fishery sampling, the fishing trips were not experimental but strictly planned by the vessel skippers according to their own interests.

Sampling was carried out from five main ports, within the two zones that host a co-management plan for the species:

- Central Catalonia: Vilanova i la Geltrú.
- Ebre Delta: l'Ametlla de Mar, Deltebre and La Ràpita.

Six monthly samplings were conducted: four from the port of Vilanova i la Geltrú, two with pots and two with traps, and the other two alternating from the port of L'Ametlla de Mar, with traps, and the ports of Deltebre or La Ràpita, with pots. For every boarding, batches of up to 30 individuals of common octopus - above minimum conservation reference weight (MCRW), established at 1000 g - were obtained and preserved in coolers to transport to the laboratory. If more than 30 individuals were caught, the extra individuals were measured (mantle length), weighted and sexed in situ. All individuals below MCRW were weighed and sexed in situ and released back to the sea.

Once in the laboratory, at the ICM-CSIC, all individuals were measured, weighed, sexed and their reproductive state was assessed.

Calculations and data analysis

For each target species, we represented the annual length frequency (weight frequency in the case of Cephalopoda) by sampling strata, as well as the monthly proportion of each maturation stage and monthly average value of gonadosomatic index (GSI). The length/weight frequency is only presented for the strata where each species is naturally present. GSI values in crustaceans are only presented for females, since males present stable GSI values throughout the year. A table with length-weight relationship parameters is provided for each species, using the relationship $W = a*TL^b$, where W is weight (g) and TL is total length (cm).

Although the present report is focused on the year 2021, data are in general presented for the years 2019, 2020, and 2021. This information is available in previous reports (ICATMAR 21-03, 19-01) but is presented again here in a unified format for clarity and ease of reference.

Bottom trawling

Bottom trawling fishery in Catalonia

A total of 118 bottom trawling sampling hauls were carried out in 2021: 14 in the shallow continental shelf, 34 in the continental shelf, 43 in the upper slope and 27 in the lower slope (Fig. 2). Exceptionally, no hauls were conducted in November due to weather inconvenience.

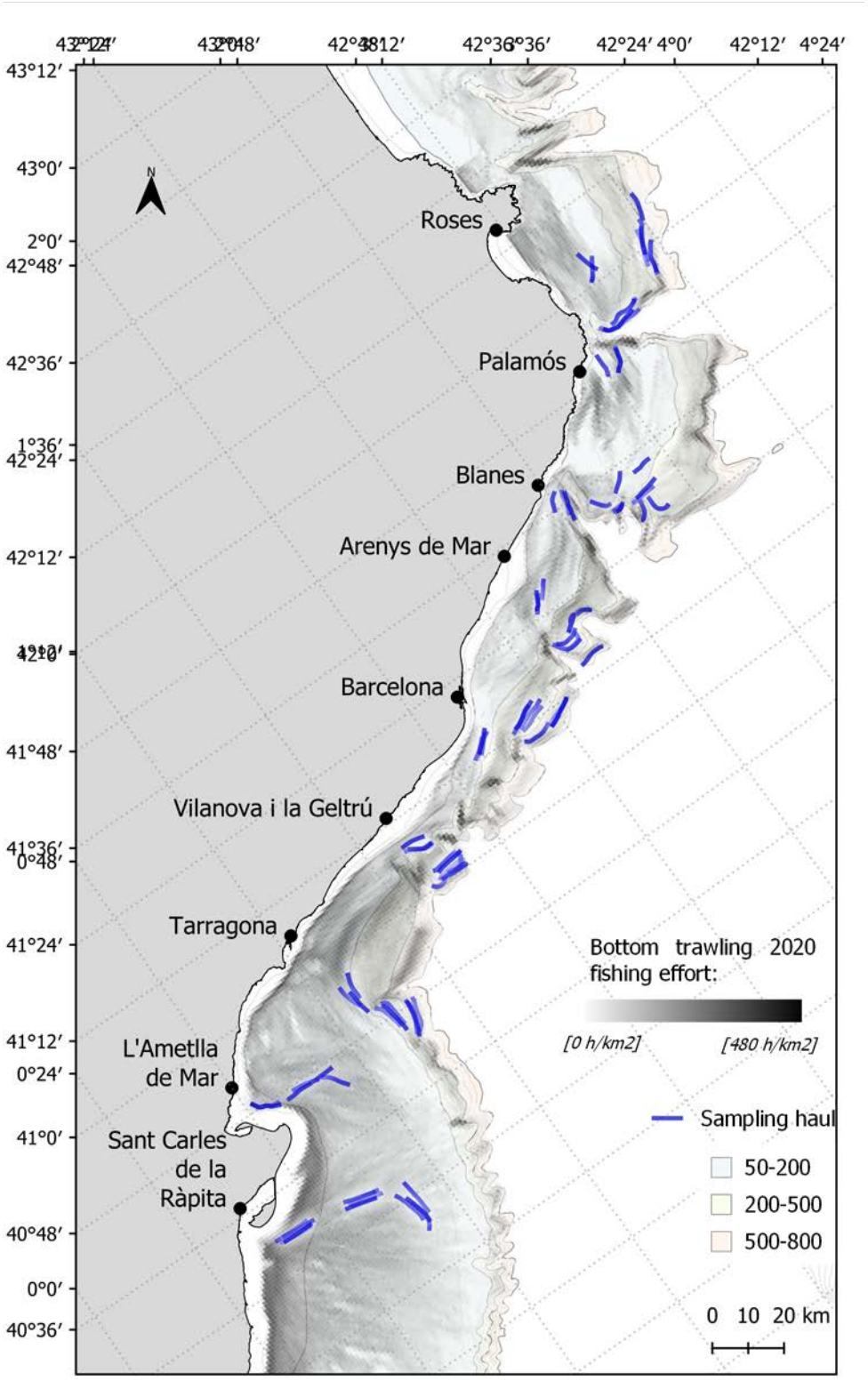


Figure 2. Bottom trawling hauls conducted in Catalonia in 2021.

We here present a general view of the catch composition of our sampling hauls in all Catalonia in 2021. For detailed tables on the catch composition at the lowest possible classification level, see Annex 1.

In 2020 and 2021 the commercial fraction of the catch was 66%, lower than in 2019 (Fig. 3). As for the discard fraction, considering all depth ranges together, it ranges between 23 and 27%.

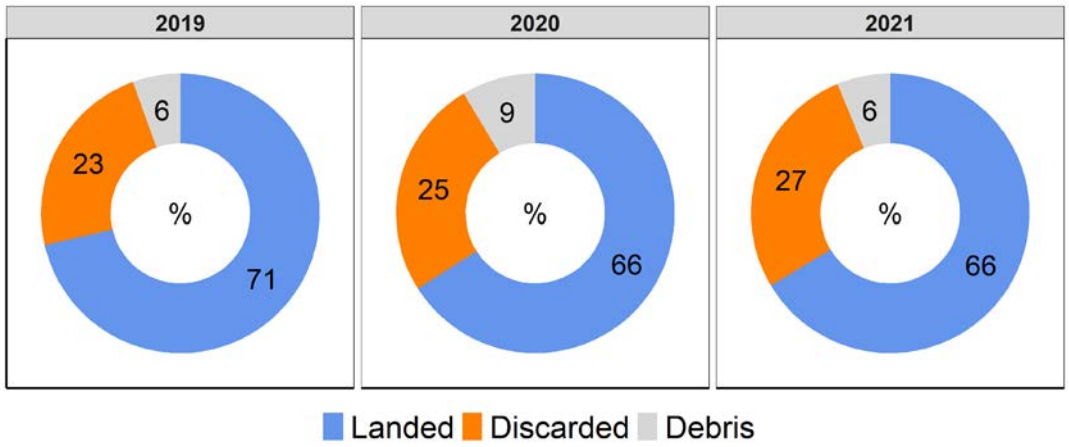


Figure 3. Catch composition for Catalonia. Percentage by weight of landings, discarded and debris fraction in each year including all hauls in all depths sampled.

The maximum number of species commercialized (without considering the discard) was found in 2019, with 164 different species (Fig. 4). At the level of Catalonia, the most important species were relatively constant over the years. It is worth noting the rise of *Parapenaeus longirostris* which, from 2020, became one of the most important crustacean catches and in 2021 it overtook the Norway lobster and the blue and red shrimp.

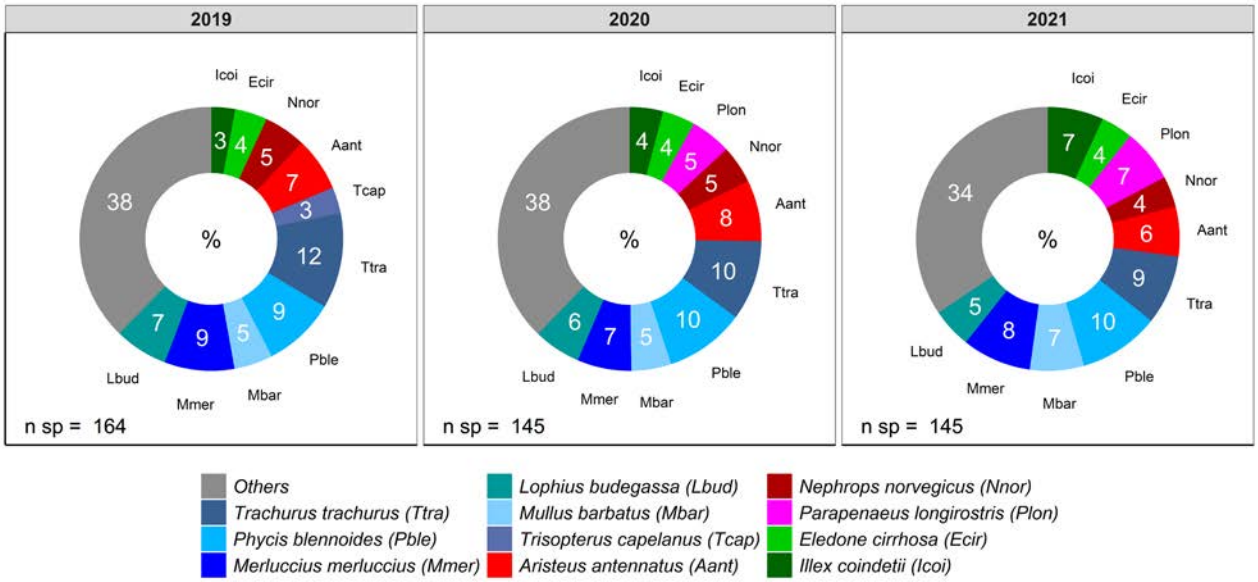


Figure 4. Species with most biomass landed including all hauls in each year.

The most important species within the discard fraction was *Scyliorhinus canicula* (Fig. 5). Of particular note in 2020 and 2021 was the presence of the crinoid *Leptometra phalangium*, which accounted for more than 10% of the biomass discarded. The presence of *P. heterocarpus* was also notable in 2020 with 4% of the biomass discarded. The proportion of commercial species in bottom trawling was more than 70% in number of species.

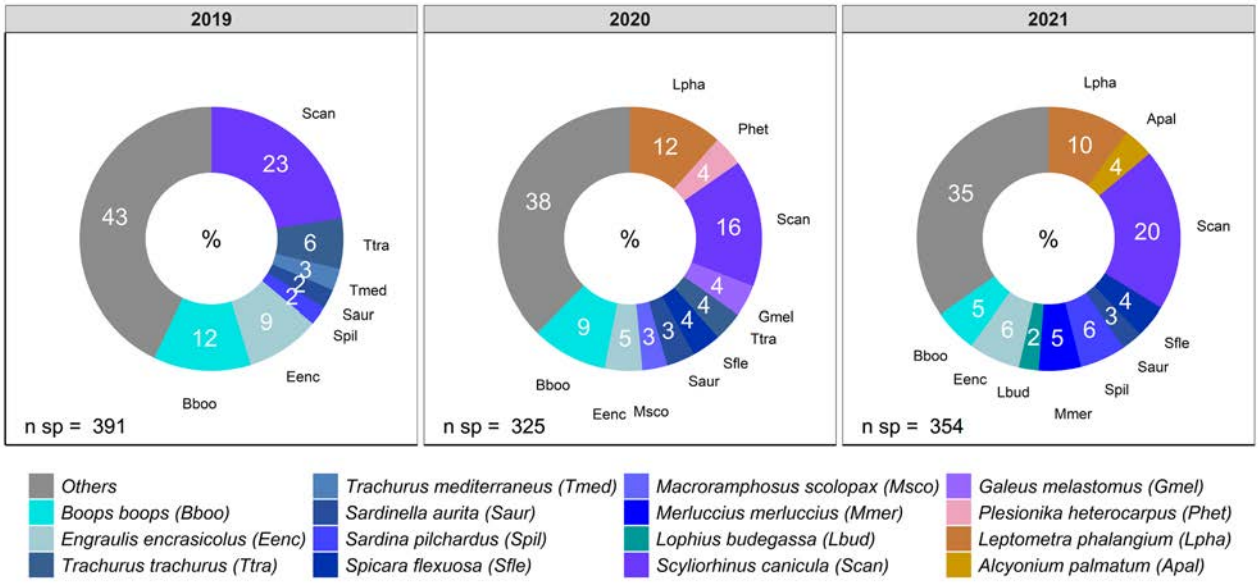


Figure 5. Species with most biomass discarded including all hauls in each year.

As for debris, the overall results were similar for all years, although a high proportion of wet wipes in 2020 is noteworthy (Fig. 6). Much of the waste was natural, including terrestrial plants, marine plants, shells or other marine organic debris. Regarding anthropogenic waste, plastic

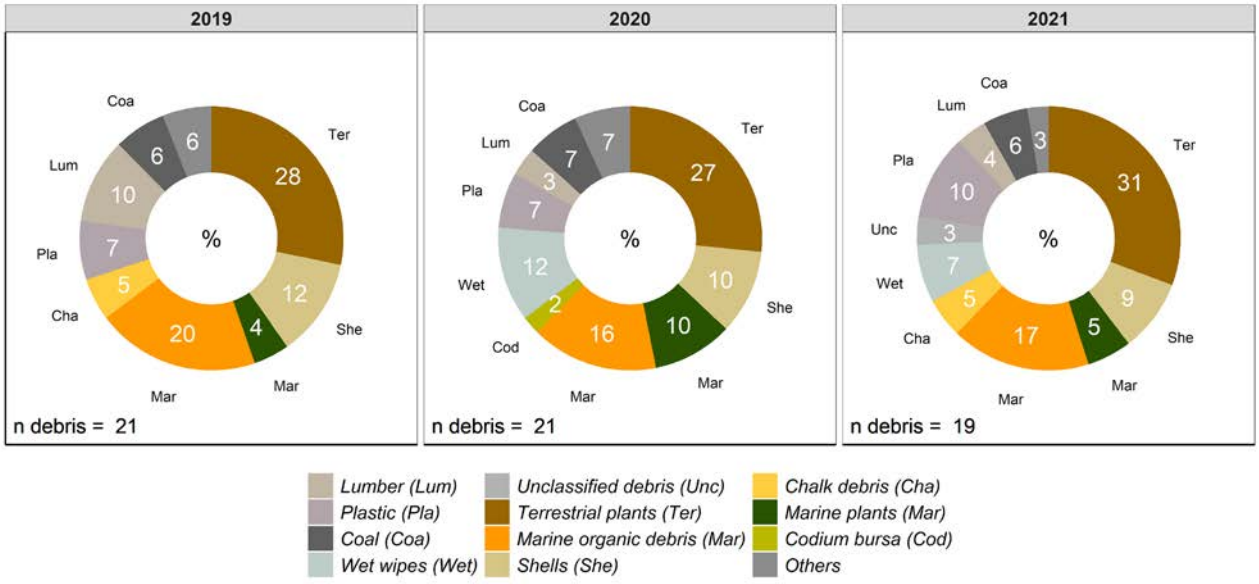


Figure 6. Cathegories with higher biomass debris including all hauls in each year.

was one of the most prevalent, along with lumber and coal, also known as clinker, the residual of burned coal from steamships that sailed the Mediterranean Sea in the 19th and 20th centuries.

The proportion of discard was similar for all years at all depth ranges (Fig. 7). Likewise, for all three years, the proportion of discard decreased with depth with the minimum found at the lower slope. It is worth noting that in 2020 the proportion of debris was slightly higher than in 2019 and 2021, possibly because it was a year with a high frequency of storms, including "Glo-

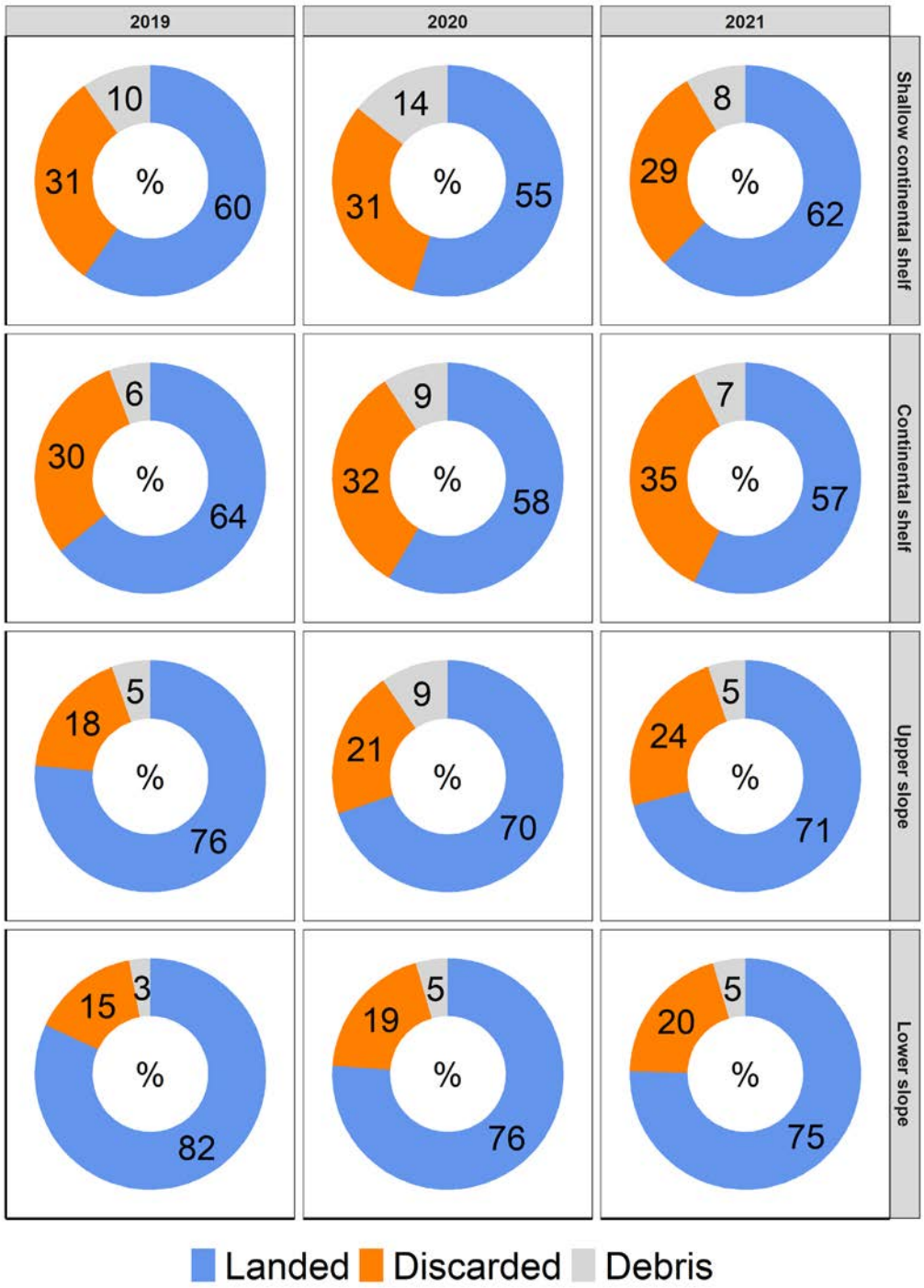


Figure 7. Catch composition for Catalonia. Percentage by weight of landings, discarded and debris fraction in each season and each fishing ground including all hauls in all ports sampled.

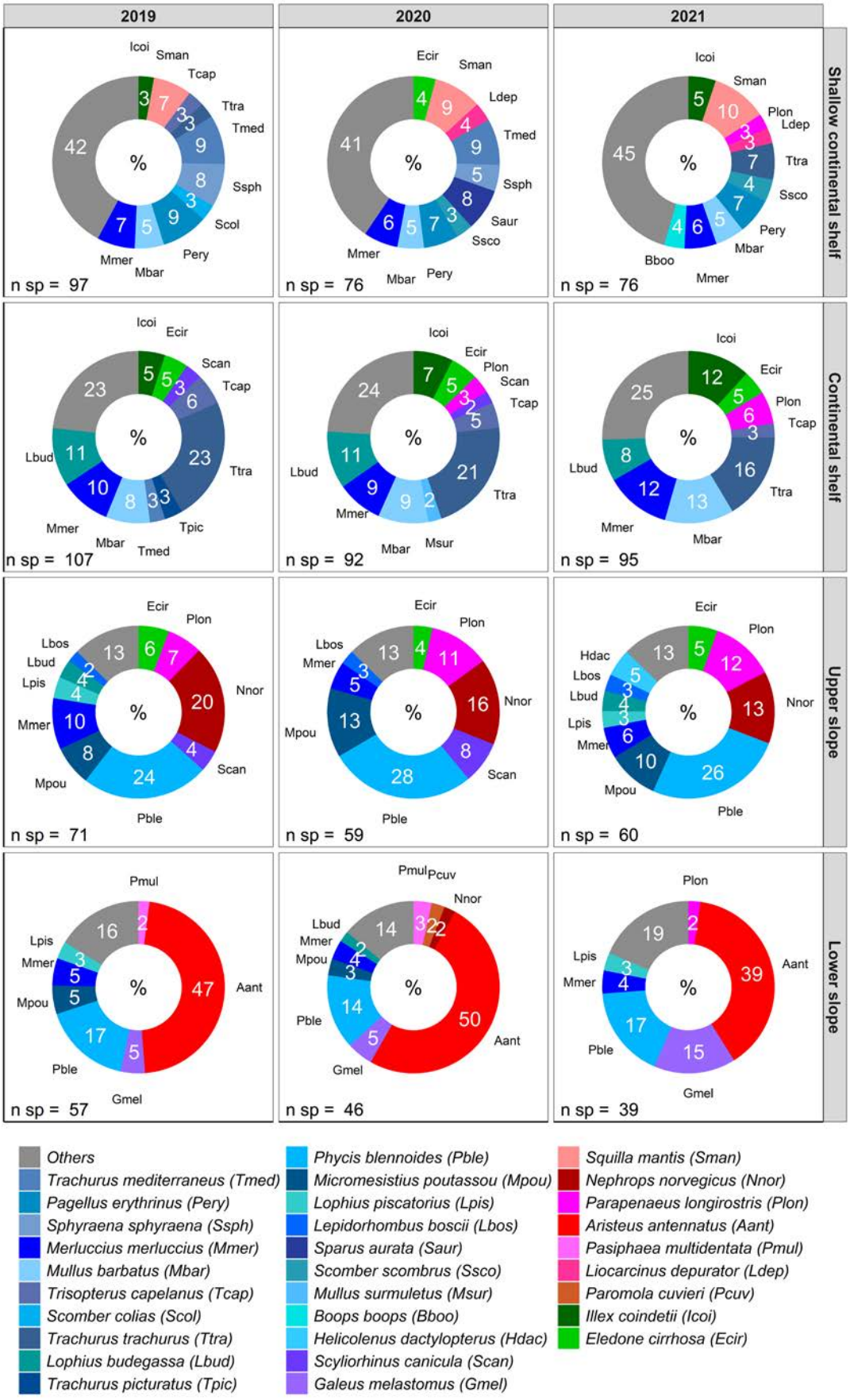


Figure 8. Species with most biomass landed. Percentage in weight including all hauls within each year and depth strata.

ria" which considerably increased the input of terrestrial waste into the sea via runoff water and gullies.

On the shallow continental shelf the main species was the spottail mantis shrimp (Fig. 8). It is noteworthy the high diversity of fish species on this depth range, accounting for a significant proportion of the catch.

The highest number of commercial species were caught on the continental shelf, *Trachurus trachurus* being the main species. However, it has to be considered that in the case of species with gregarious behavior, such as *T. trachurus,* biomasses might be overestimated when calculating them by extrapolating the weight by swept area.

On the upper slope, the main commercial species was *Phycis blennoides*. As for the target species, the Norway lobster showed a decrease in its catches shifting from 20% in 2019 to 13% in 2021. On the other hand, *P. longirostris* showed an increase, shifting from 7% in 2019 to 12% in 2021.

On the lowest depth range, the lower slope, the blue and red shrimp was, by far, the most important species in terms of biomass landed. It accounted for a range from 39 to 50% of the commercial catch, being 2021 the year with the lowest biomass landed for the species.

On the shallow continental shelf, the European pilchard and the European anchovy were the main discard fish species, especially in 2021 when the two species together accounted for 55% of the total discard (Fig. 9). In 2020, *Sardinella aurita* stood out, accounting for 21% of the total discard.

On the continental shelf, *S. canicula* represented 23% of the total discard in 2019, followed by *B. boops* which accounted for 15%. Most invertebrates, which were a large part of the diversity of species found in this depth range, are in the "Others" category, as the biomass represented by each species is low. In 2020 and 2021, as observed in the overall figure for Catalonia (Fig. 5), *L. phalangium* accounted for 19 and 18% of the total discard, respectively. On the other hand, in 2020 *P. heterocarpus*, as also observed in Figure. 5, stood out for representing 6% of the total discard, given this species is not abundant in this depth range. The peak of biomass for this species is the result of a single day of fishing when a large amount of discard was caught, with *P. heterocarpus* alone accounting for a total of 583 Kg.

On the upper slope, the elasmobranch *S. canicula* was the main species, representing more than 50% of the total discard over the three years (51 - 62%), whereas on the lower slope, *G. melastomus,* together with *S. canicula,* also played an important role within the total discard.

If results are analyzed by year and by depth strata, they are highly variable (Fig. 10). However, in broad terms, wet wipes were found to be very abundant in 2020, both on the continental shelf and on the lower slope, where they accounted for 17 and 24% (by wet weight), respec-

tively, of the total debris. It is also worth noting that plastic and its derivatives were found every year in all depth strata.

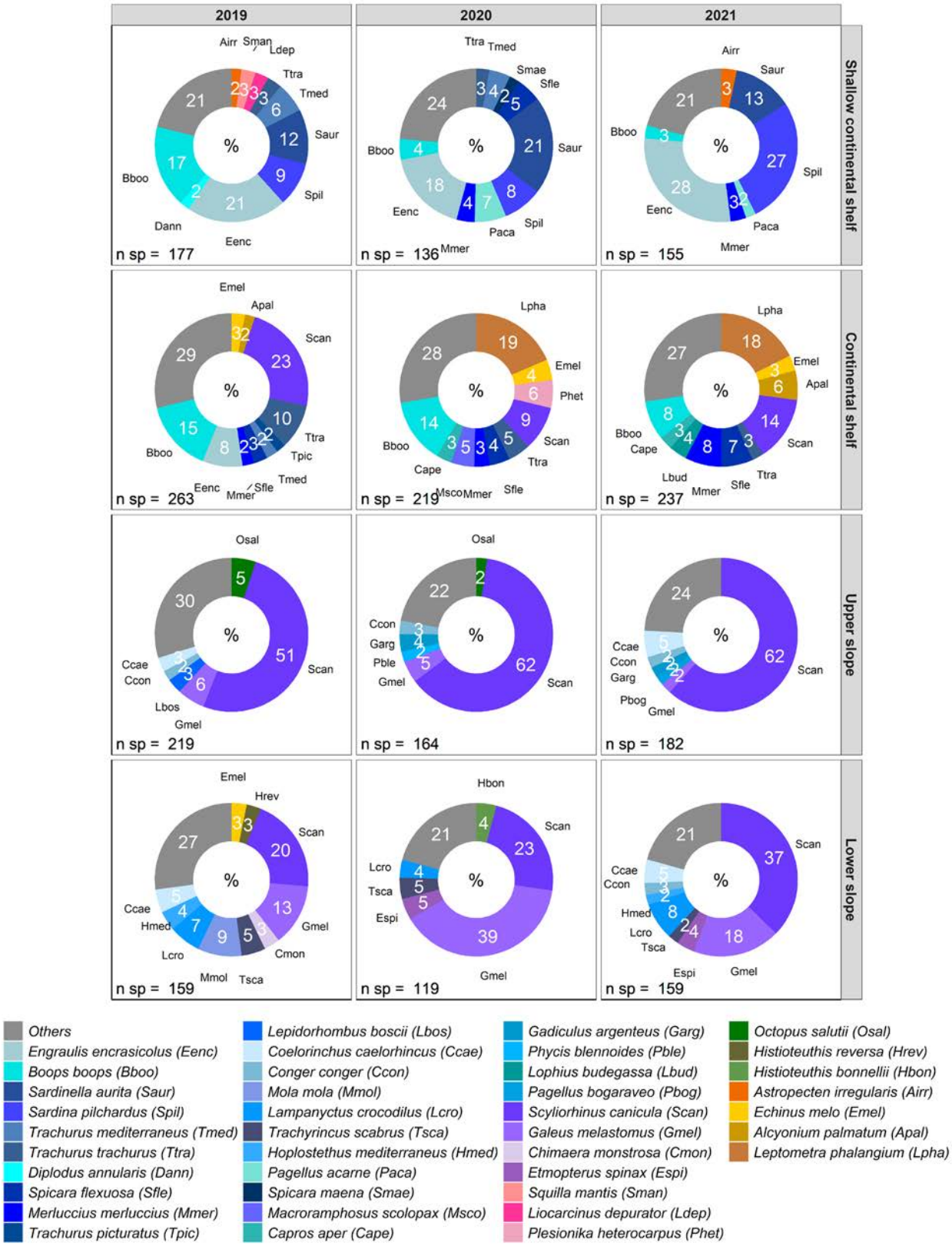


Figure 9. Species with most biomass discarded. Percentage in weight including all hauls within each year and depth strata.

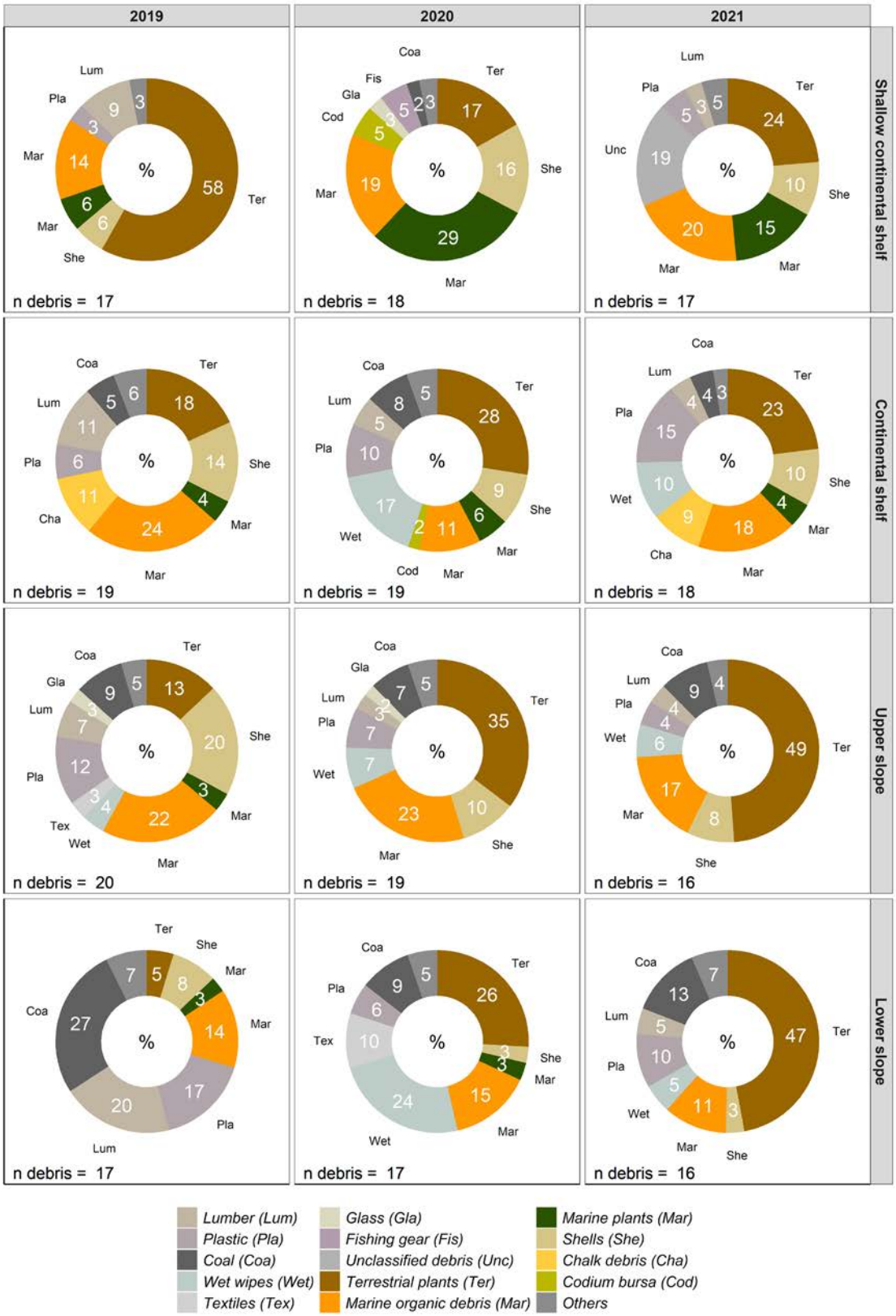


Figure 10. Cathegories with higher mass debris. Percentage in weight including all hauls within each year and depth strata.

Figures 11, 12 and 13 show the spatial representation of fishing effort, total catches, and revenues by fishing effort for the bottom trawling fleet in 2021.

The spatial distribution of fishing effort (h/km^2), catch (kg), and revenues per unit effort (€/h·km^2) is presented in Figures 11, 12, and 13 for the years 2018 to 2021. Fishing effort is generally focused on submarine canyons in the North and Center zones, with more emphasis in the shallow continental slope in the Ebre Delta. Total catch is concentrated around the shallower waters of the Ebre Delta and along the Center zone, while the revenue per unit effort is higher in the northernmost parts of the studied area, with similar values near the shelf break of the Ebre Delta as well.

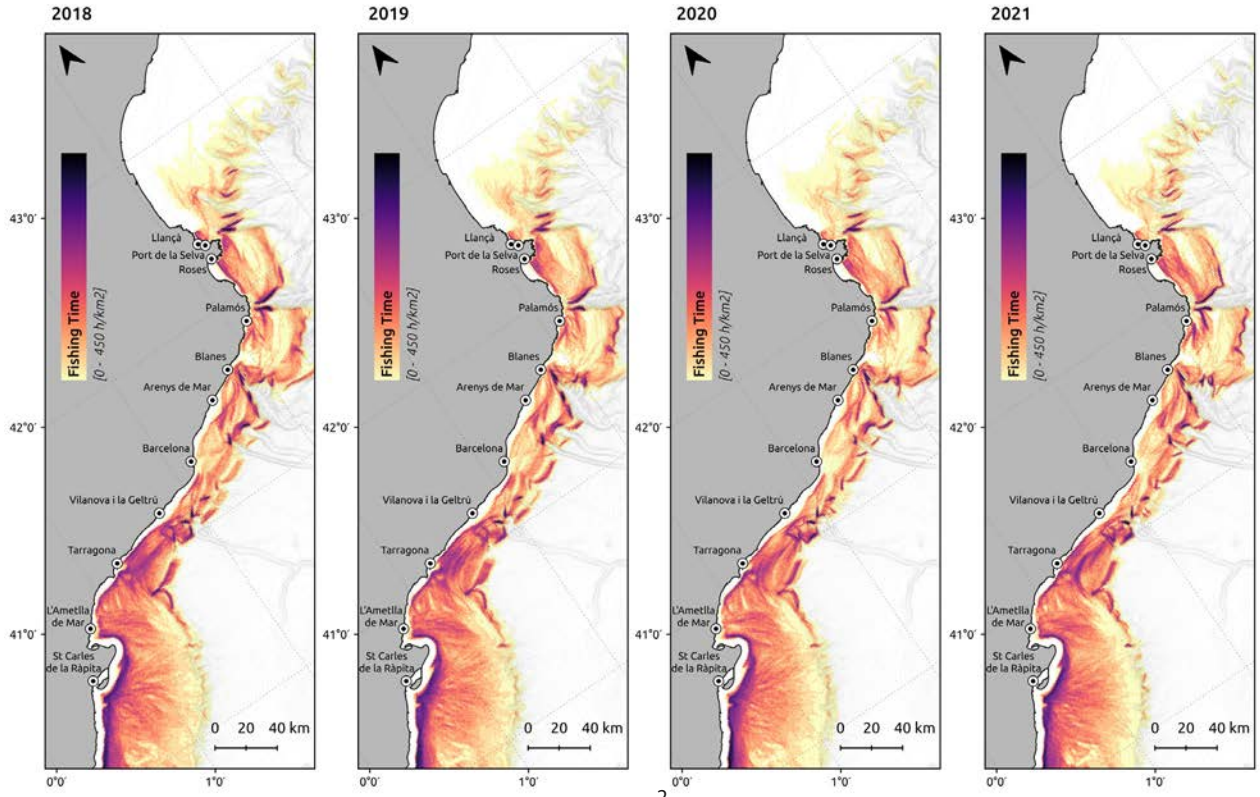


Figure 11. Spatial distribution of fishing effort (h/km^2)

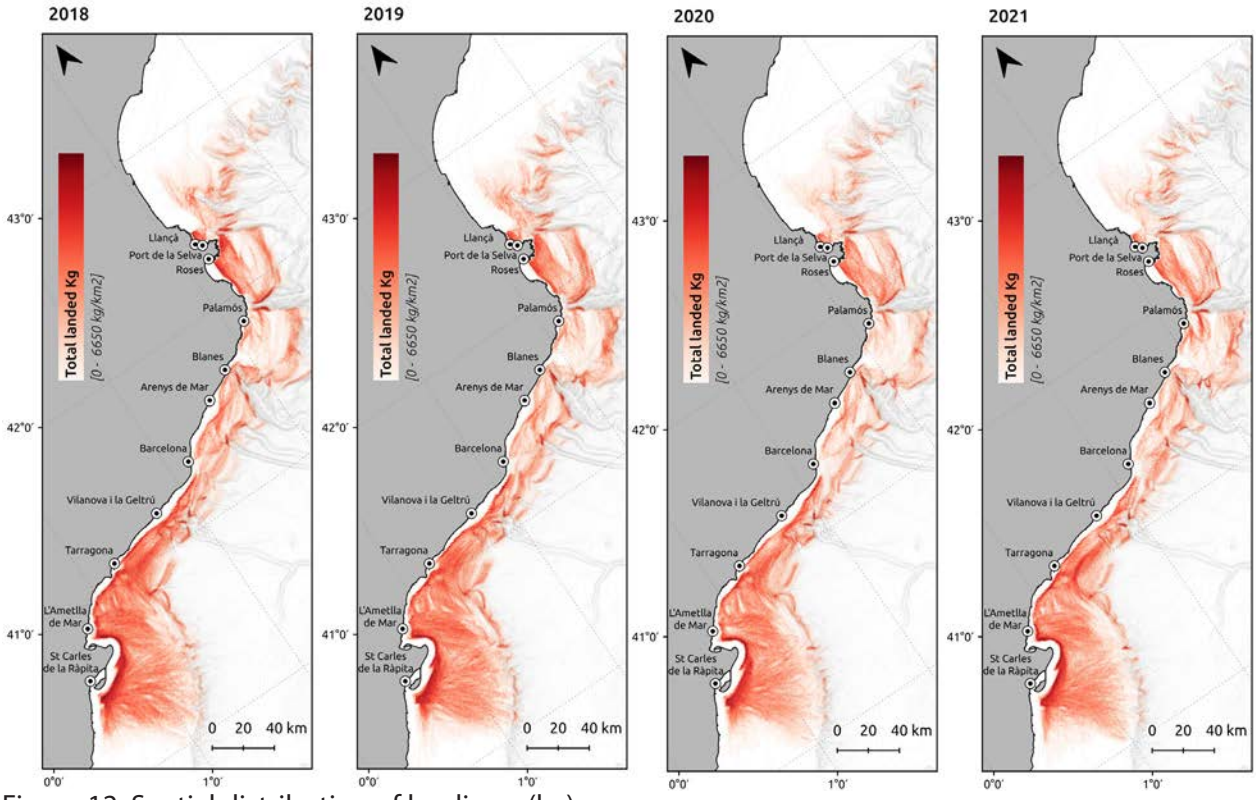


Figure 12. Spatial distribution of landings (kg)

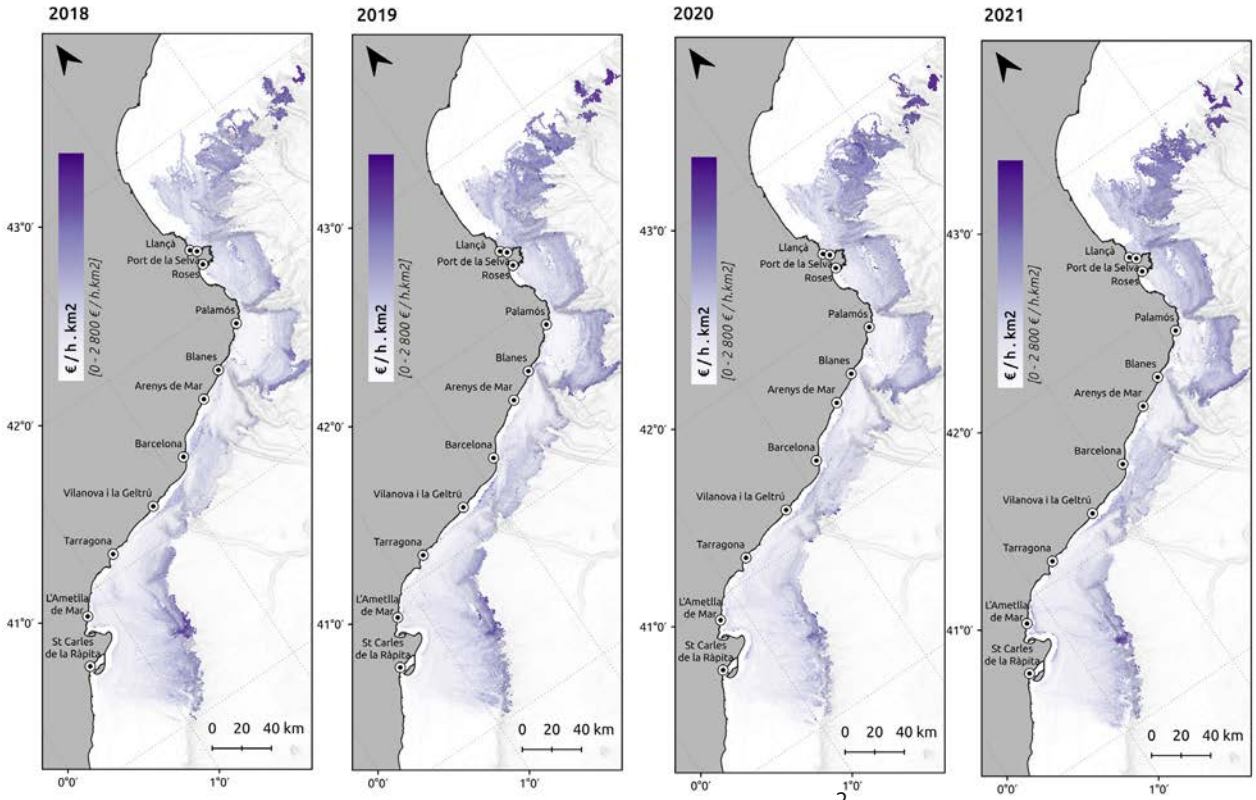


Figure 13. Spatial distribution of revenues per unit of effort (€/h·km^2)

Bottom trawling by species

Hake (*Merluccius merluccius*) HKE

The total hake catch in Catalonia in 2021 was 646.32 t, over 94% of which was caught by bottom trawling (ICATMAR, 22-03).

The spatio-temporal length-frequency distribution of hake indicates that the species was more abundant in the continental shelf for all years, despite being also present in the shallow continental shelf, the upper slope and, with the lowest abundances, in the lower slope (Fig.15). In terms of catch size, a significant proportion of individuals, especially on both continental shelves, were caught below the minimum conservation reference size (MCRS) for the species, established at 20 cm.

The catch was dominated by small-sized individuals in both continental shelves for all years, corresponding to recruits of the species. However, in both upper and lower slopes, the catch was dominated by large-sized individuals, mostly caught above the MCRS.

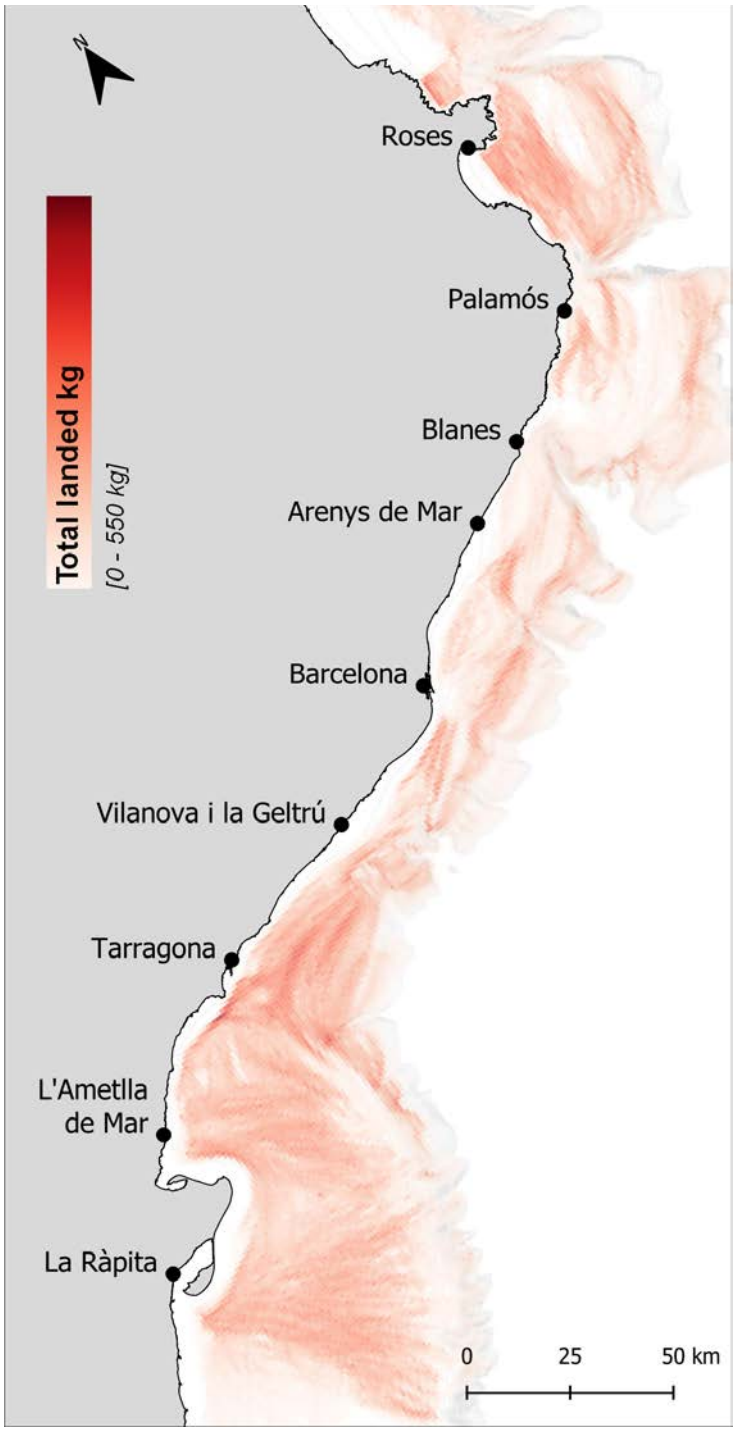


Figure 14. Spatial distribution of Hake landings.

Table 2. Hake length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.0060	3.0606	0.9835	2 137
Females	0.0063	3.0469	0.9822	998
Males	0.0062	3.0458	0.9754	956

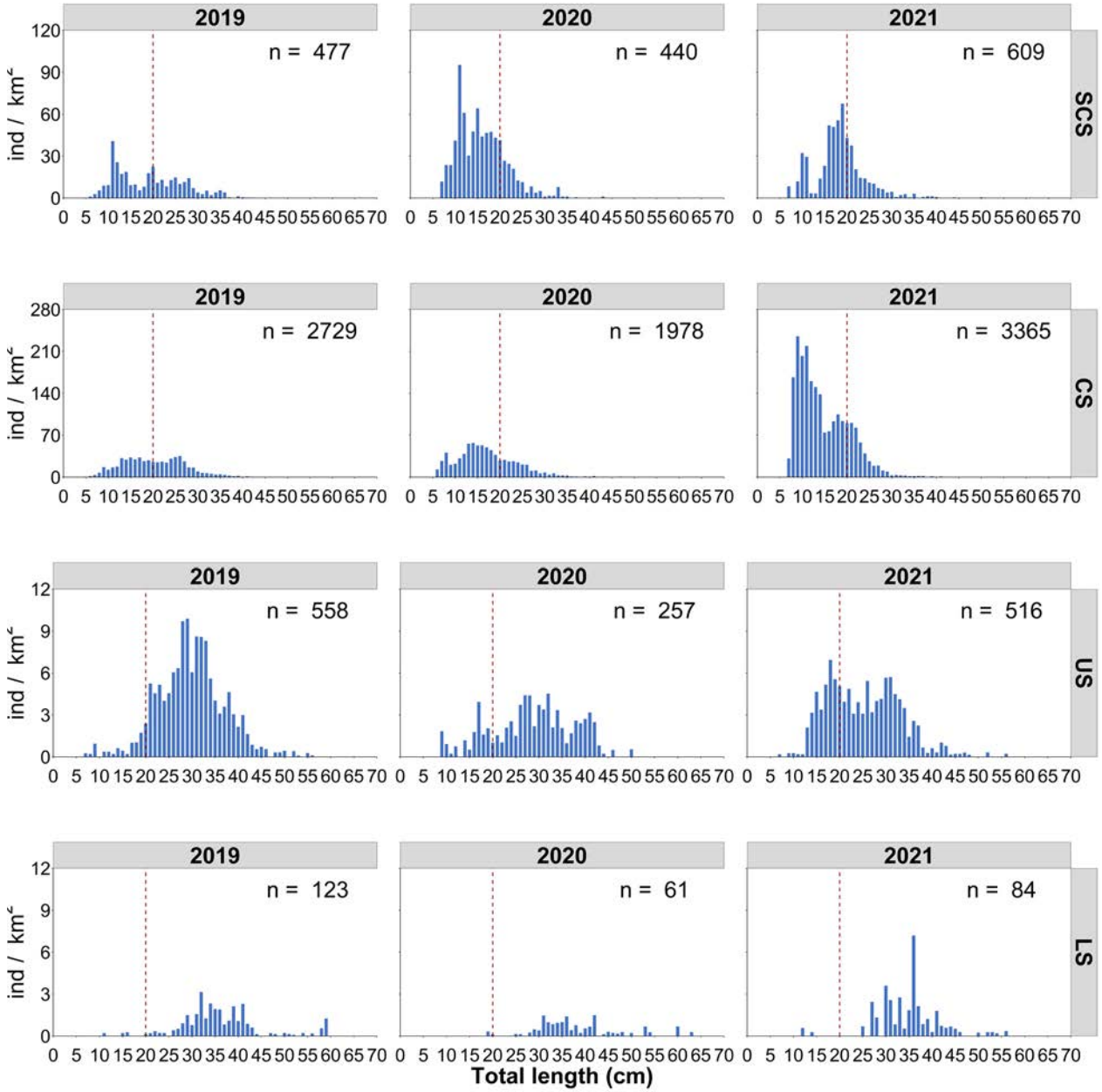


Figure 15. Annual length-frequency distribution of Hake at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from 2019 to 2021 in Catalonia. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) total number of measured individuals.

When comparing between years, maximum abundances of hake recruits (<10 cm) were found in the continental shelf (2021) and shallow continental shelf (2020), suggesting an acceptable recruitment for the species or, at least, better than 2019 when hake recruits were poorly caught. Interestingly, the highest abundances of hake in the upper slope were observed in 2019, with a mode located around 30 cm, whereas in 2020 and 2021 hake abundances decreased and the mode moved towards smaller sizes.

According to length-weight relationship parameters for both sexes combined (Table 2), hake displayed a positive allometric growth (b > 3). Likewise, when applying the growth curves separately for males and females, both sexes exhibited positive allometric growth.

A total of 288 females and 415 males were biologically analyzed to study the gonadal cycle of hake for 2021 (Fig. 16). Males and females in advanced maturity and spawning stages (stages IV and V respectively) were present all year round in low proportion. The reproductive activity for females seemed to concentrate from late summer to late winter, when the highest number of spawners were detected, and from September to February in males. The proportion of individuals in resting stage (stage II) was high throughout the year, especially in females. Results of gonadosomatic index (GSI) showed higher values for females in winter and summer months, with two peaks in March and September respectively, whereas the lowest values were recorded during the spring months. Likewise, males displayed maximum GSI values from September to February and minimum values during spring months. It is worth noting that GSI values present high variability throughout the year for both sexes, especially in females.

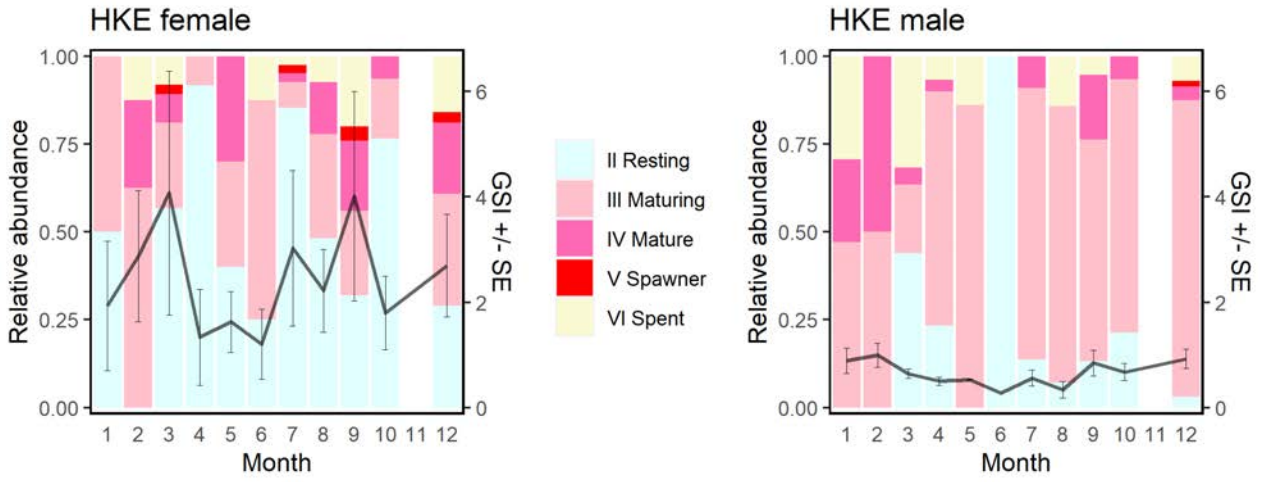


Figure 16. Hake monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Norway lobster (*Nephrops norvegicus*) NEP

The total Norway lobster catch in Catalonia in 2021 was 112.44 t, practically all of which were caught by bottom trawling (ICATMAR, 22-03).

The spatio-temporal length-frequency distribution of Norway lobster indicates that the species was more abundant (> 250 ind/km^2) on the upper slope, reaching the maximum number of measured individuals in 2019 (Fig.18). The following years, its abundance slightly decreased (below 200 ind/km^2 in 2021). Comparing 2020 and 2021, the results were similar, although it is worth noting that in 2020 there were less samplings and data due to the COVID-19 pandemic. On the shallow continental and the continental shelves, the abundance was very low but most of the measured individuals were above the MCRS for the species, established at 20 mm.

Individuals on the upper and lower slopes showed a wider size distribution, ranging from 15 to 55 mm of cephalothorax length. On the upper

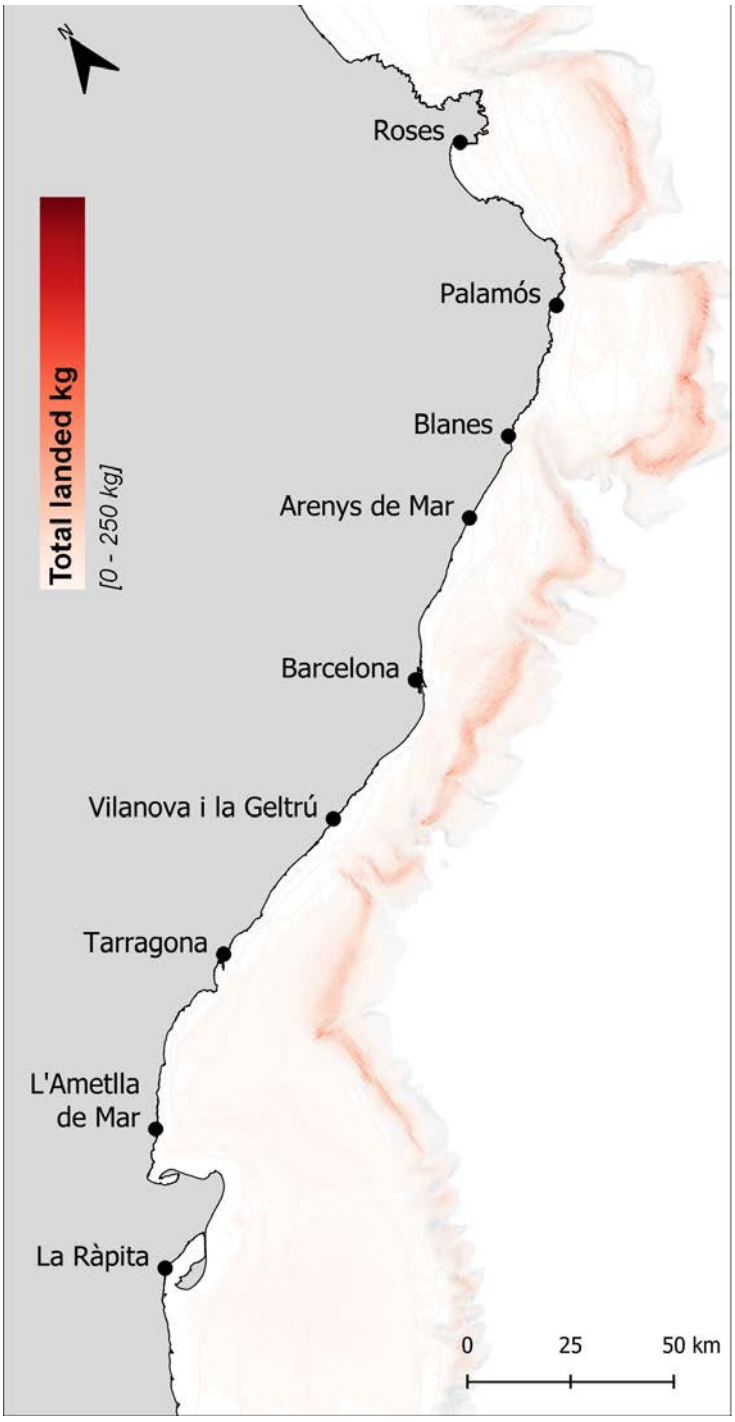


Figure 17. Spatial distribution of Norway lobster landings.

Table 3. Norway lobster length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.0004	3.1447	0.96	2112
Females	0.0005	3.1362	0.91	783
Males	0.0004	3.1884	0.97	1329

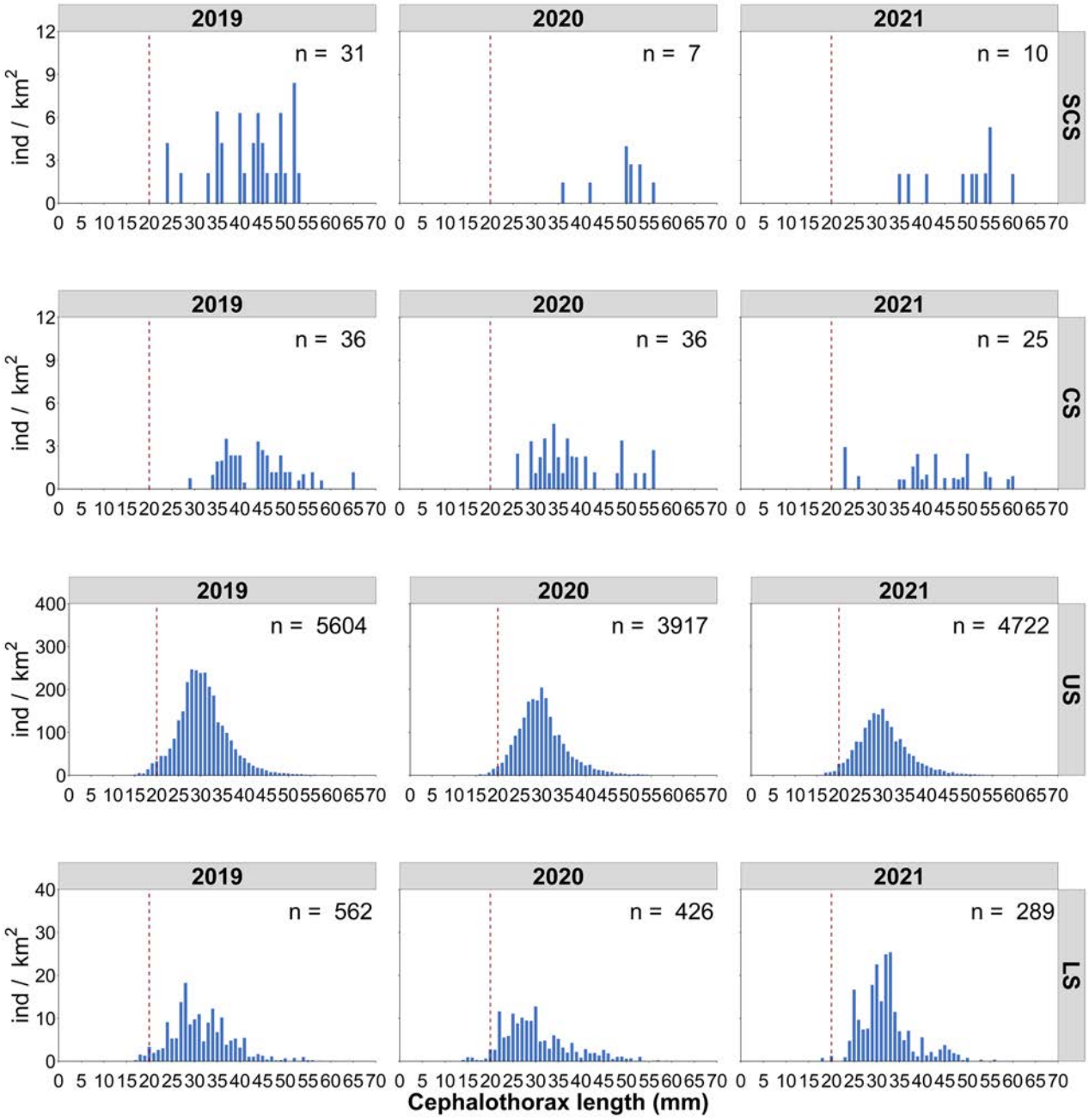


Figure 18. Annual length-frequency distribution of Norway lobster at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from 2019 to 2021 in Catalonia. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) total number of measured individuals.

slope a higher abundance of individuals with a cephalothorax length of approximately 30 mm was observed over the three years. In 2021 on the lower slope, there was a slight increase in size, with a higher abundance of individuals with a cephalothorax length of around 33 mm. However, especially on the upper slope, a small proportion of the individuals caught were under the MCRS.

According to length-weight relationship parameters for both sexes combined (Table 3), Norway lobster displayed a positive allometric growth (b > 3). Likewise, when applying the growth curves separately for males and females, both sexes exhibited positive allometric growth. Out of the measured individuals, there was a higher proportion of males which are larger in size and weight than females.

A total of 728 females were biologically analyzed to study the gonadal cycle of the Norway lobster for 2021 (Fig. 19). Females in mature state (stages IV) were present from March to October, showing a peak in the months of June and July. The reproductive activity seemed to concentrate in the months of July and August when the highest number of spawners were detected and high GSI values were found. The proportion of individuals in resting stage (stage II) was high in January and February and from October onwards. Results of gonadosomatic index (GSI) showed higher values from May to September, whereas the lowest values were recorded during the winter months. It is worth noting that GSI values presented high variability from July to October.

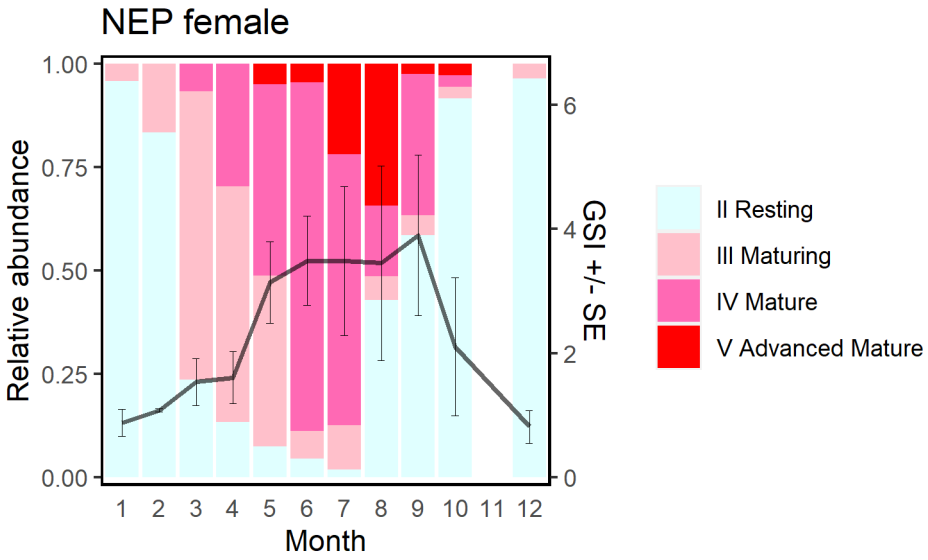


Figure 19. Norway lobster monthly gonadal cycle for females. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Blue and red shrimp (*Aristeus antennatus*) ARA

The total catch of blue and red shrimp in Catalonia in 2021 was 352.18 t, practically all of which were caught by bottom trawling (ICATMAR, 22-03).

No blue and red shrimp individuals were measured neither on the shallow continental nor the continental shelf strata given that there was no catch as the species inhabits the slope at deeper depths (Fig. 21).

The spatio-temporal length-frequency distribution of blue and red shrimp indicates that the species was more abundant on the lower slope, reaching its maximum in 2019. The following years its abundance slightly decreased, although it is worth noting that in 2020 there were less samplings and data due to the COVID-19 pandemic.

The length-frequency for all three years was similar for both the upper and lower slopes and, in general, it ranged between 16 and 63 mm of cephalothorax length. In 2021 on the lower slope, the mode slightly moved towards bigger sizes (29 mm).

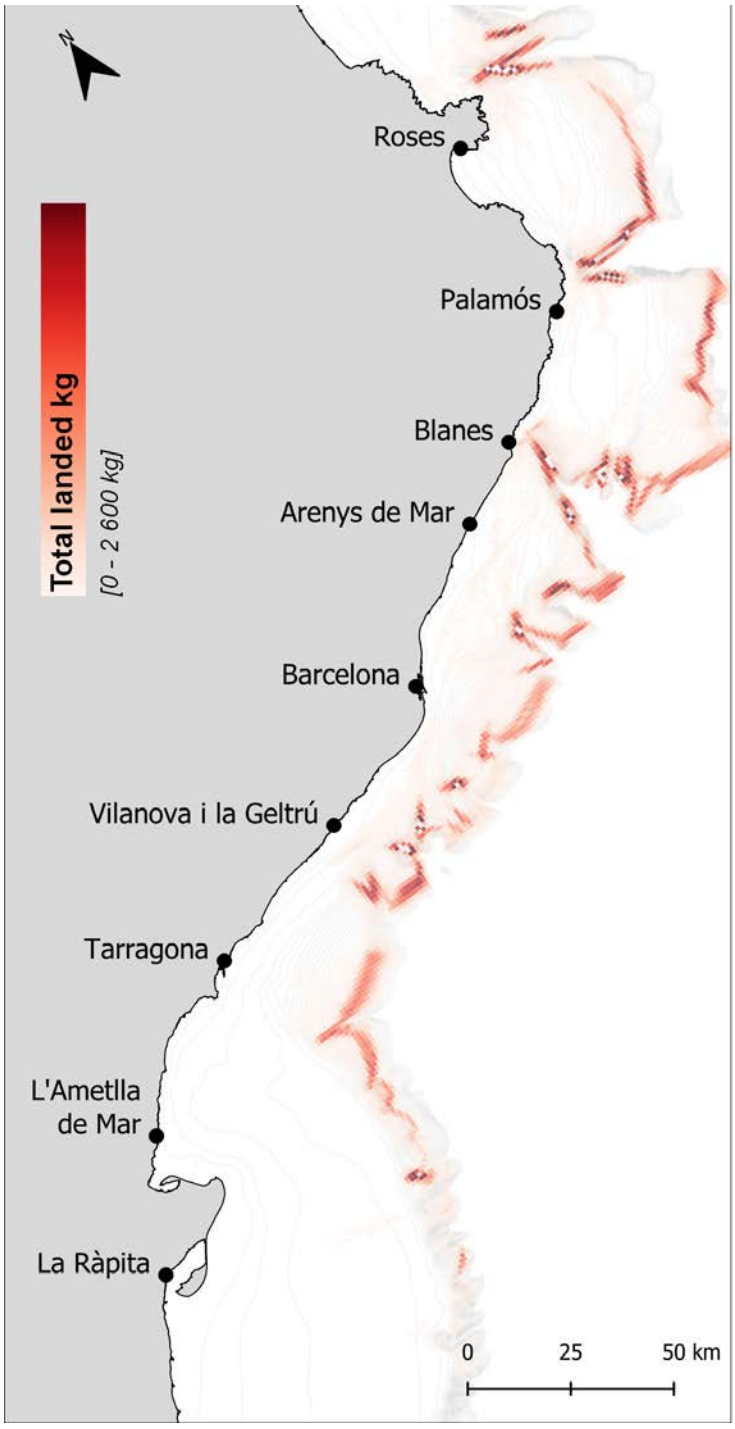


Figure 20. Spatial distribution of Blue and red shrimp landings.

Table 4. Blue and red shrimp length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.0035	2.4178	1	2361
Females	0.0035	2.4146	1	2163
Males	0.011	2.0576	0.8	197

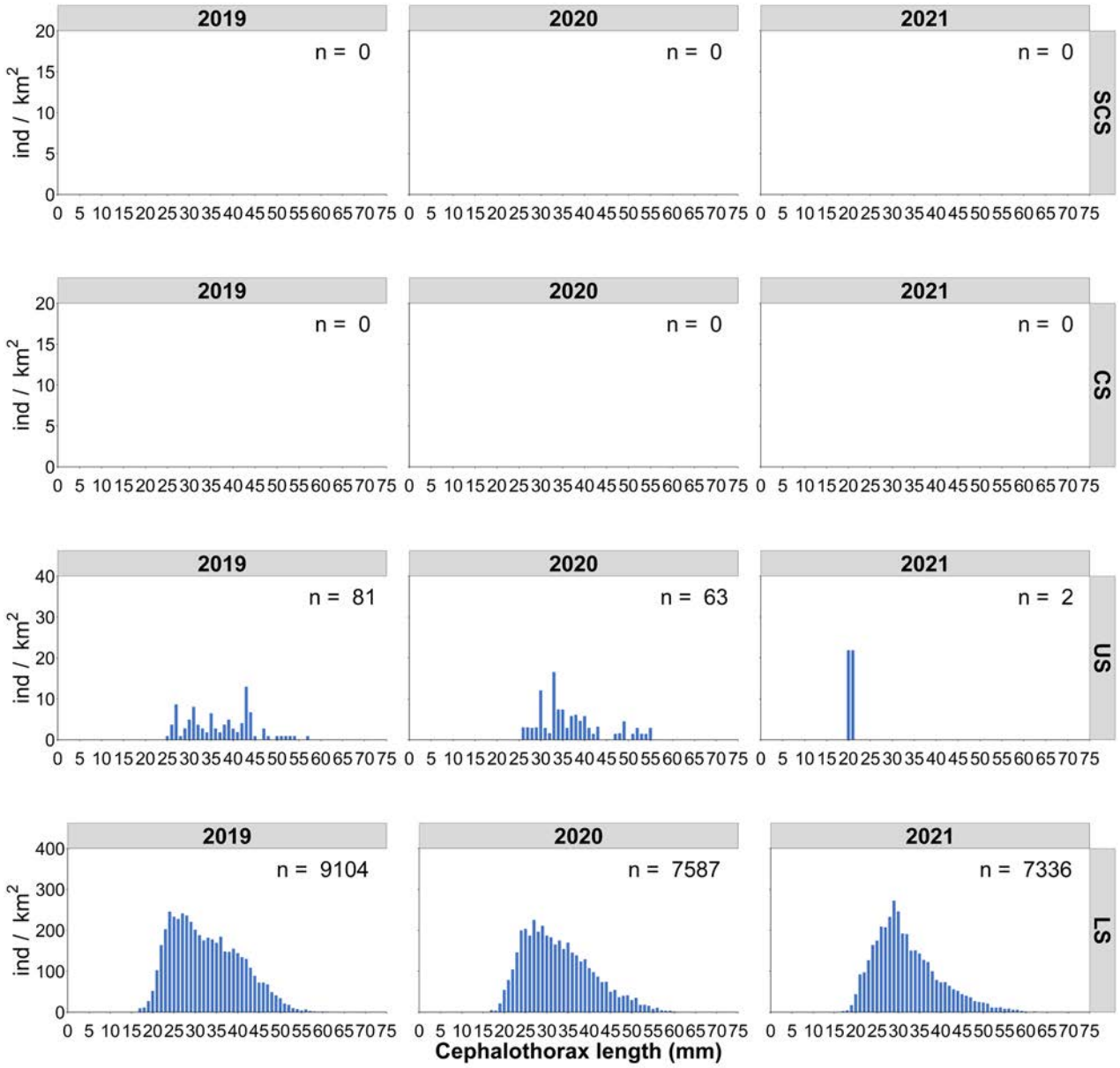


Figure 21. Annual length-frequency distribution of Blue and red shrimp at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from 2019 to 2021 in Catalonia. (n) total number of measured individuals.

Even though there is no MCRS established for the species, the catch showed a considerable proportion of individuals under the size at first maturity (28 mm, female cephalothorax length),

According to length-weight relationship parameters for both sexes combined (Table 4), blue and red shrimp displayed a negative allometric growth ($b < 3$). Likewise, when applying the growth curves separately for males and females, both sexes exhibited negative allometric growth. In contrast with the Norway lobster, a higher proportion of females were measured which are larger in size and weight than males.

A total of 2080 females were biologically analyzed to study the gonadal cycle of the blue and red shrimp for 2021 (Fig. 22). Females showed a highly seasonal reproductive cycle. Females in mature state (stages IV) were present from May to September, showing a peak in the month of July. The reproductive activity seemed to concentrate in the months of July and August when the highest GSI values were found. From January to April and from October onwards, all individuals were in resting stage (stage II).

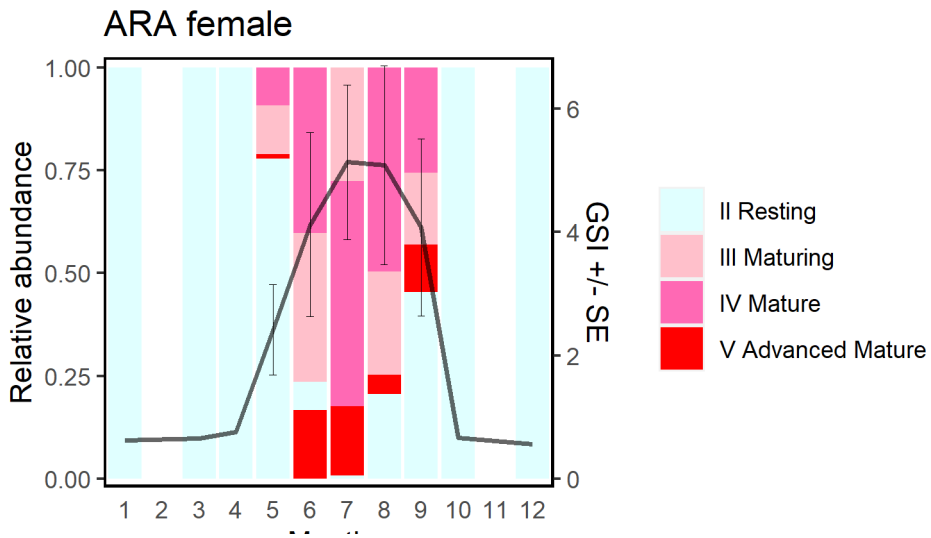


Figure 22. Blue and red shrimp monthly gonadal cycle for females. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Horned octopus (*Eledone cirrhosa*) EOI

The total horned octopus catch in Catalonia in 2021 was 298.71 t, over 97% of which were caught by bottom trawling (ICATMAR, 22-03).

The spatio-temporal weight-frequency distribution of horned octopus indicates that the species was more abundant on the continental shelf for all years, followed by the upper slope (Fig. 24). In contrast, this species was almost absent in the shallow continental shelf and the lower slope. The catch was dominated by individuals between 100 and 200 g on the continental shelf, and between 200 and 300 g on the upper slope for all years. When comparing between years, higher abundances of horned octopus were found between 2019 and 2020 in all depth strata, suggesting a decreasing trend of abundance.

According to length-weight relationship parameters for both sexes combined (Table 5), horned octopus displayed a negative allometric growth ($b < 3$). Likewise, when applying the growth curves separately for males and females, both sexes exhibited negative allometric growth.

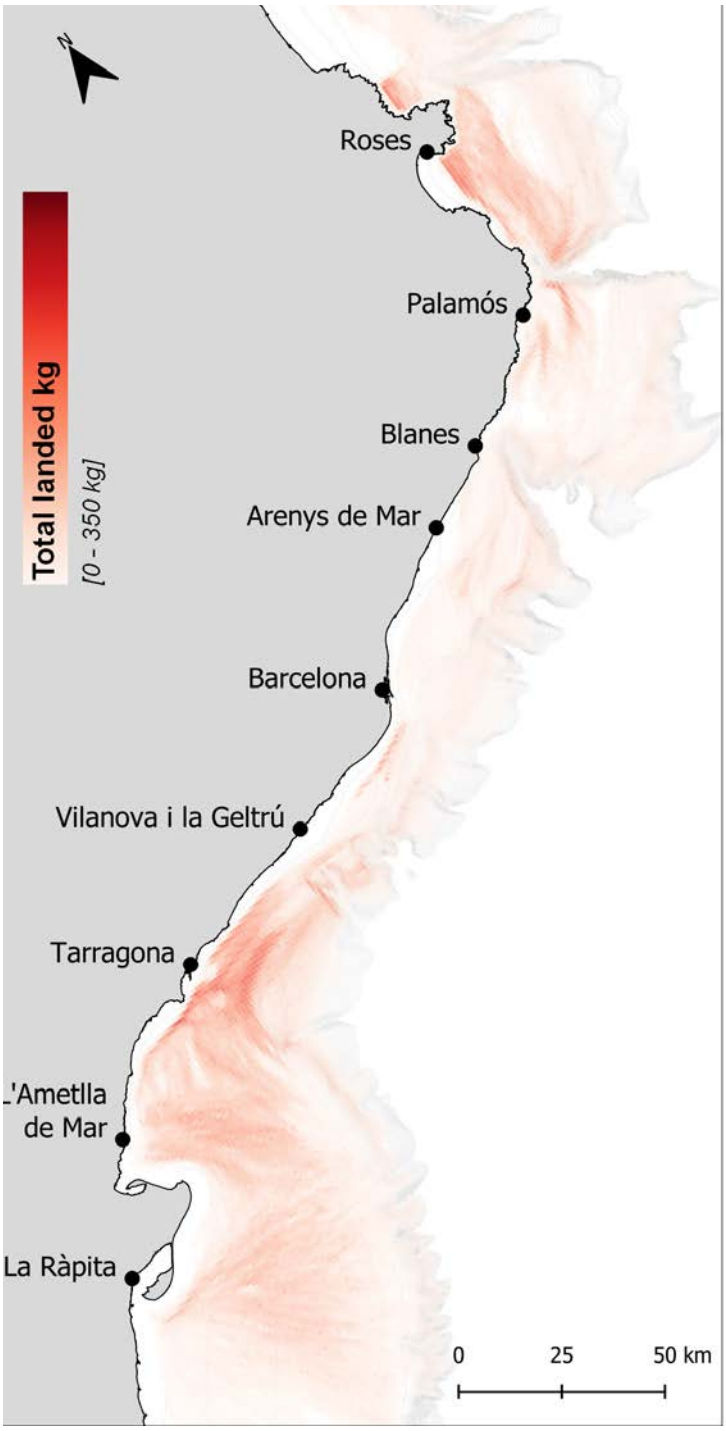


Figure 23. Spatial distribution of Horned octopus landings.

Table 5. Horned octopus length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.6245	2.6694	0.9	576
Females	0.8727	2.5310	0.8	302
Males	0.5195	2.7436	0.8	262

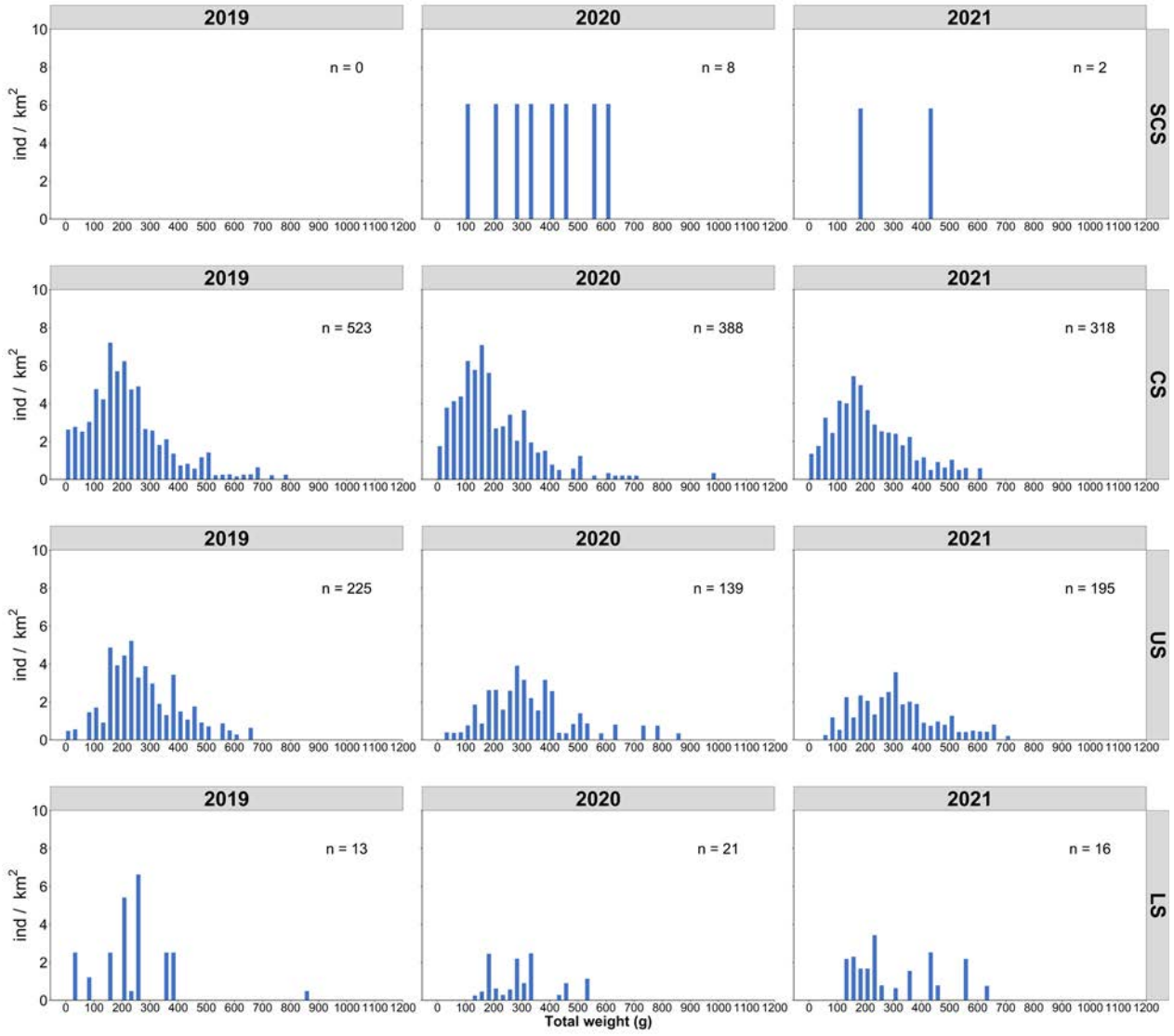


Figure 24. Annual weight-frequency distribution of Horned octopus at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from 2019 to 2021 in Catalonia. (n) total number of measured individuals.

A total of 258 females and 231 males were biologically analyzed to study the gonadal cycle of the horned octopus for 2021(Fig. 25). The species showed a spawning period during spring and early summer, as the highest proportion of mature and spawner specimens was found between April and June. Males showed an earlier maturation, with advanced mature individuals occurring in January. The lower proportion of spawner females may be caused by a faster senescence process after spawning than in males, which leads to an earlier death.

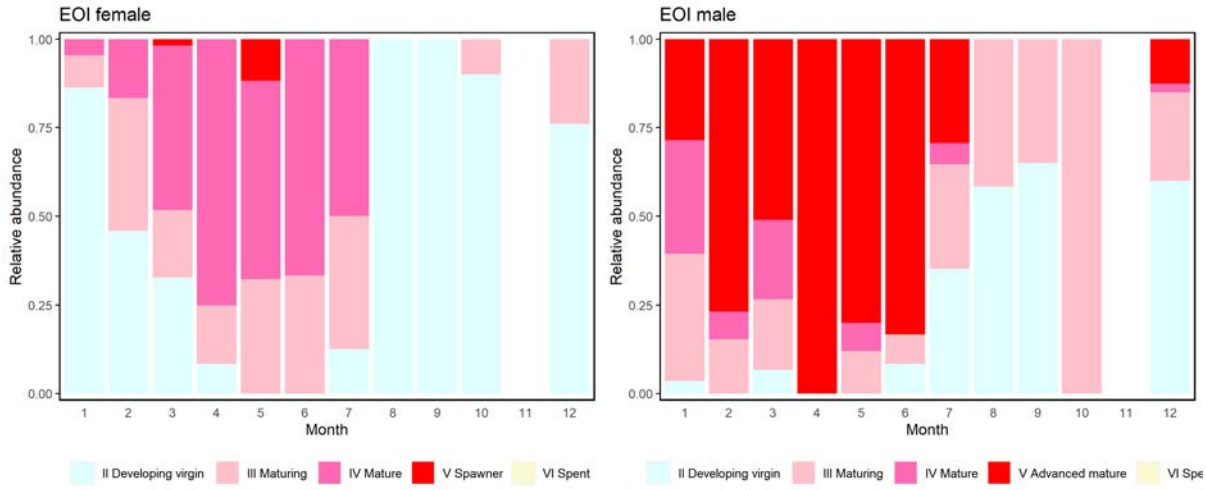


Figure 25. Horned octopus monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Spottail mantis shrimp (*Squilla mantis*) MTS

The total spottail mantis shrimp catch in Catalonia in 2021 was 372.97 t, over 95% of which was caught by bottom trawling (ICATMAR, 22-03).

No spottail mantis shrimp individuals were measured neither on the upper nor the lower slope strata, given that there was no catch as the species inhabits its shallower depths (Fig. 27).

The spatio-temporal length-frequency distribution of spottail mantis shrimp indicates that the species was more abundant on the shallow continental shelf for all years.

The length-frequency distribution was similar on both the shallow continental and the continental shelf for all years, ranging from 8 to 38 mm of cephalothorax length with predominance of individuals around 25 mm of cephalothorax length. It is worth noting that in 2021 on the shallow continental shelf there was a higher abundance of larger individuals. On the other hand, on the continental shelf a bimodal length-frequency distribution was observed in 2020 and 2021, with peaks of abundance at 19 and 25 mm of cephalothorax length.

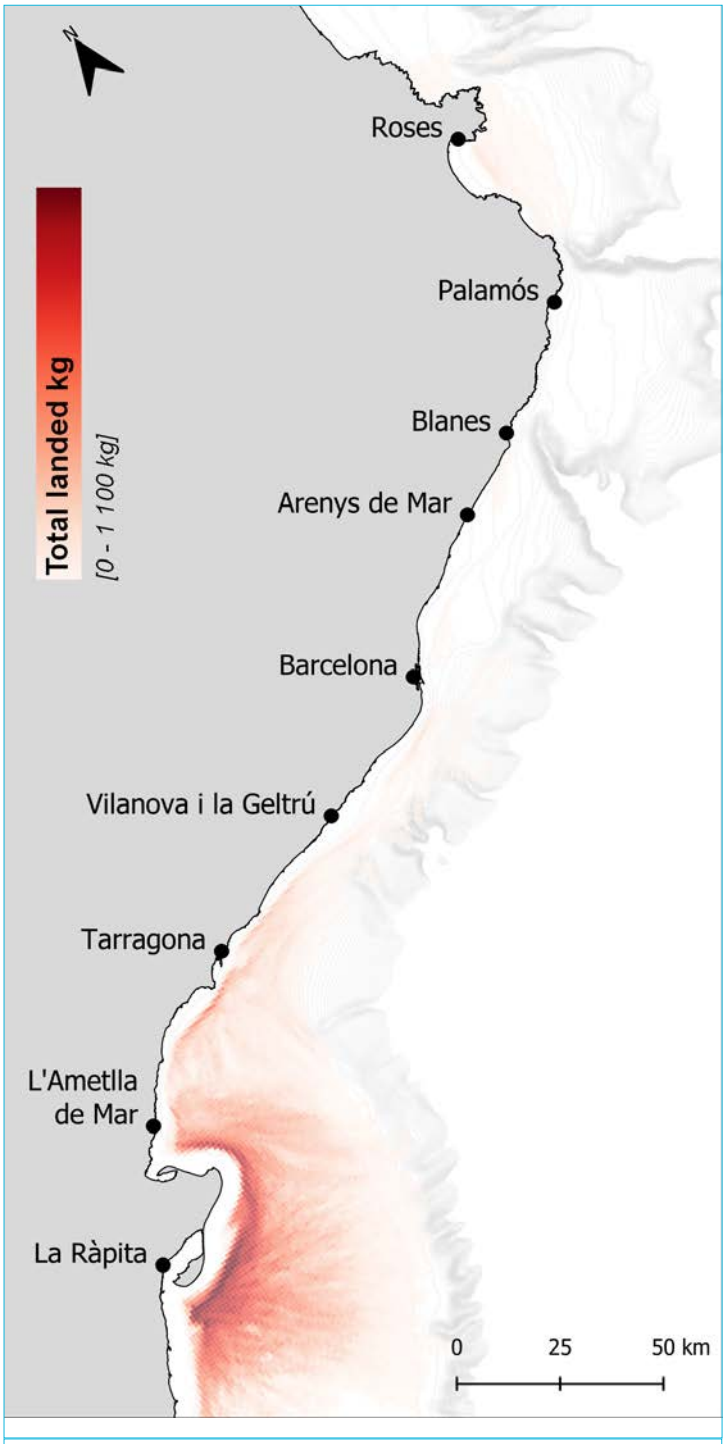


Figure 26. Spatial distribution of Spottail mantis shrimp landings.

Table 6. Spottail mantis shrimp length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.0024	2.8753	0.9	818
Females	0.0024	2.8781	0.9	450
Males	0.0026	2.8567	0.9	367

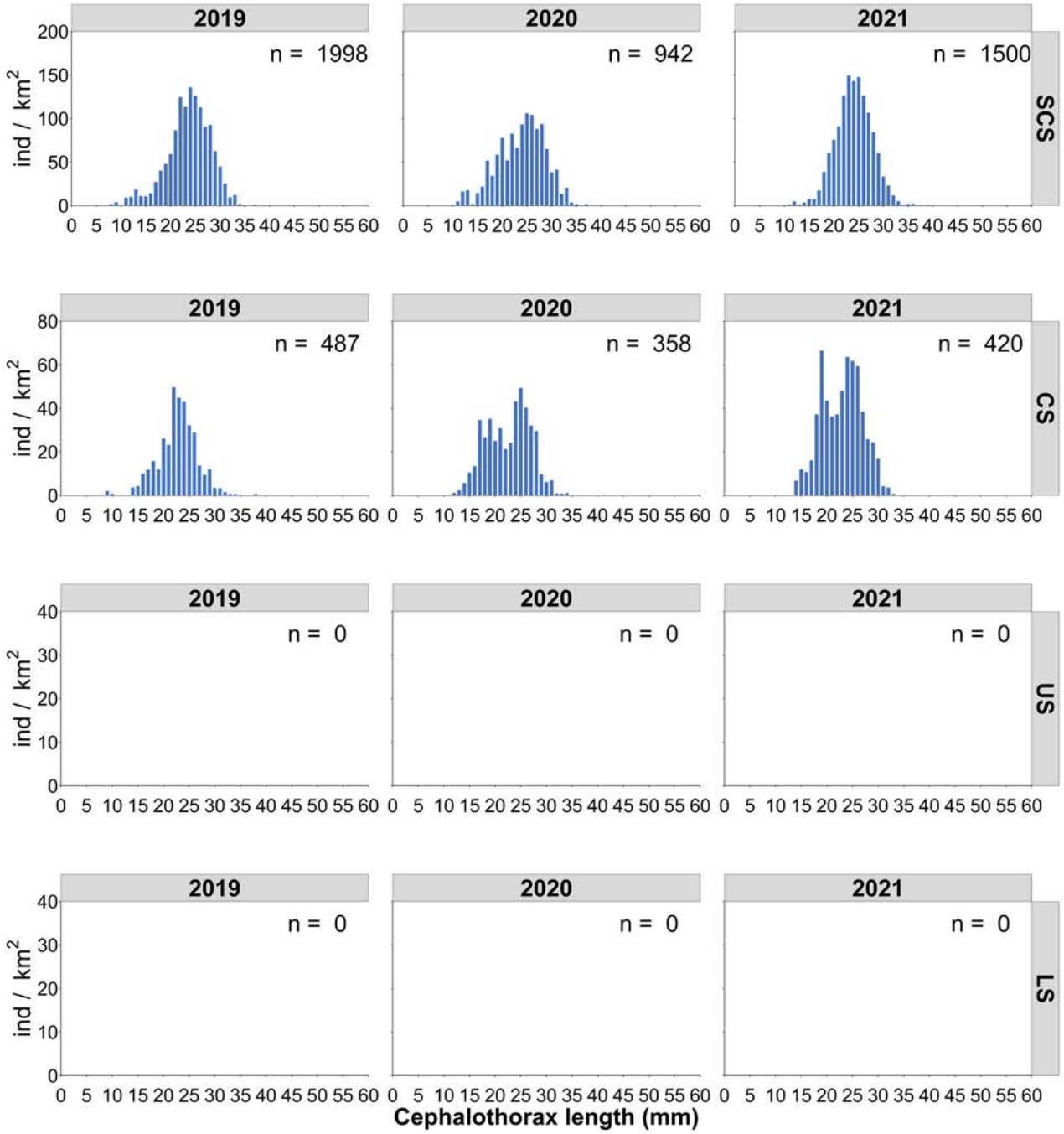


Figure 27. Annual length-frequency distribution of Spottail mantis shrimp at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from 2019 to 2021 in Catalonia. (n) total number of measured individuals.

According to length-weight relationship parameters for both sexes combined (Table 6), spottail mantis shrimp displayed a negative allometric growth (b < 3). Likewise, when applying the growth curves separately for males and females, both sexes exhibited negative allometric growth.

The length-weight relationship is similar for both sexes. However, females are slightly larger than males, especially during the breeding season due to the high development of their gonads during this period. For the samples analyzed in 2021, an almost equal sex ratio was obtained.

A total of 450 females were biologically analyzed to study the gonadal cycle of the spottail mantis shrimp for 2021 (Fig. 28). Females' reproductive cycle showed a marked seasonality, ranging from December to early spring. Most females were in maturing stage (stage III) during winter with a peak of abundance during the month of March. The remaining months females were in resting stage (stage II).

It is worth mentioning that there are no data for June and October because there was no sampling during these months. For the remaining months without data (January, April, July, August, September and November), there was no catch even though samplings were conducted, probably due to individuals in mature and spawning stages (stages IV and V) were in shallower waters at late winter and early spring and our sampling design did not cover this bathymetry.

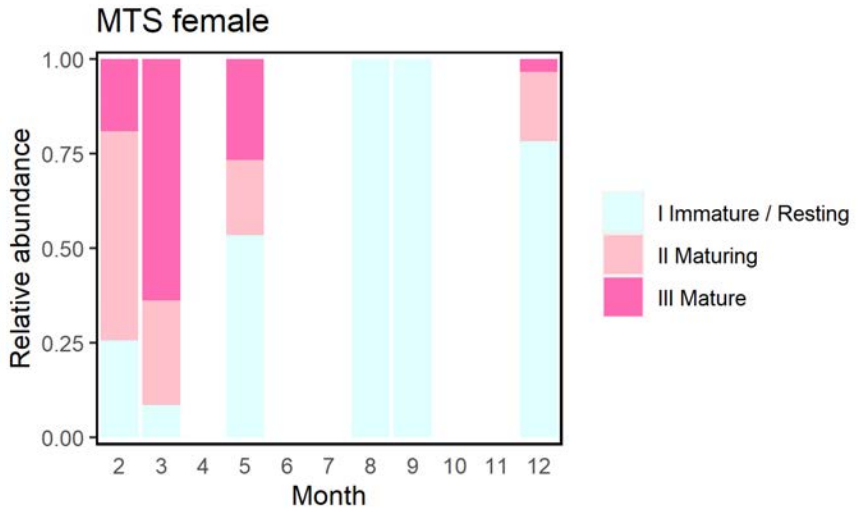


Figure 28. Spottail mantis shrimp monthly gonadal cycle for females. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Caramote prawn (*Penaeus kerathurus*)

TGS

The total caramote prawn catch in Catalonia in 2021 was 71.35 t, only 38% of which were caught by bottom trawling (ICATMAR, 22-03). This species is mainly caught by small-scale fisheries.

Caramote prawn individuals were only measured on the shallow continental shelf since there was no catch on the rest of depth ranges (Fig. 30).

The spatio-temporal length-frequency distribution of caramote prawn indicates that the species' size range extended from 19 to 56 mm of cephalothorax length, with a mode located at 30 mm of CL for all years. In 2021, the number of measured individuals was almost 50% of the ones measured in 2019, however, there was a higher presence of larger individuals.

According to length-weight relationship parameters for both sexes combined (Table 7), caramote prawn displayed a negative allometric growth (b < 3). Likewise, when applying the growth curves separately for males and females, both sexes exhibited negative allometric growth.

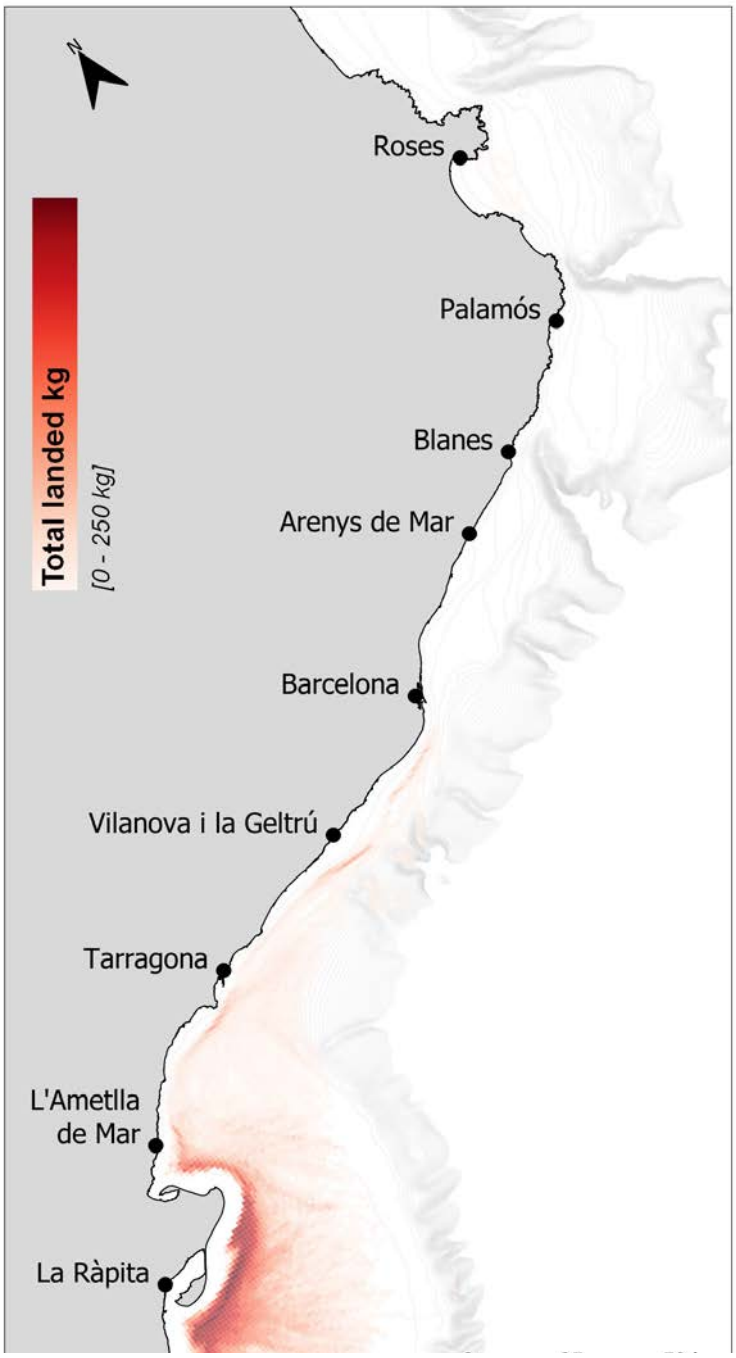


Figure 29. Spatial distribution of Caramote prawn.

Table 7 Caramote prawn length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.0053	2.3809	1	177
Females	0.0032	2.4999	1	88
Males	0.0028	2.5652	0.9	61

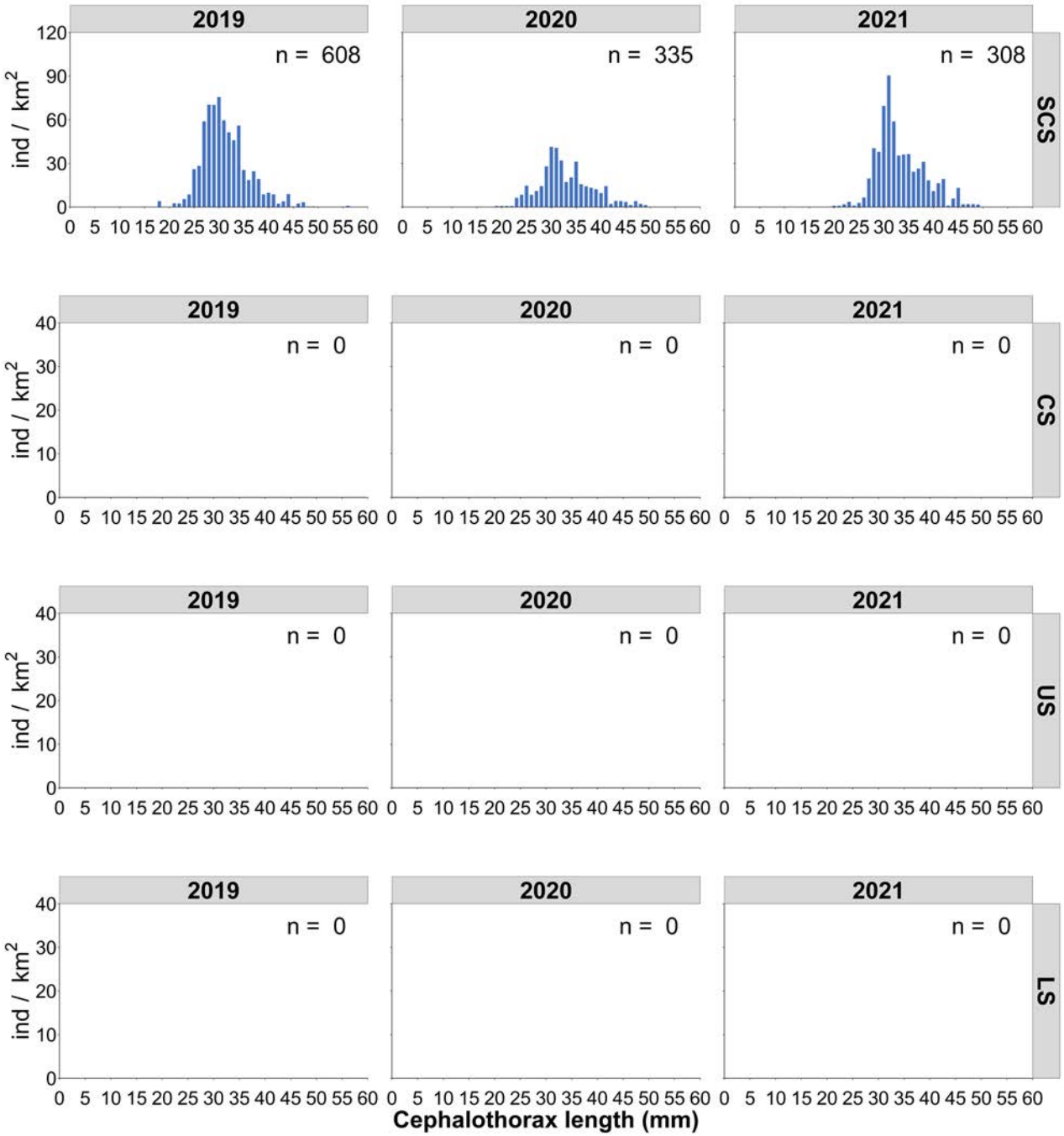


Figure 30. Annual length-frequency distribution of Caramote prawn at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from 2019 to 2021 in Catalonia. (n) total number of measured individuals.

The total number of analyzed individuals (both sexes combined) was 177 in 2021. In order to obtain more adjusted results, more data on smaller individuals and from the months when there was no catch would be required. As other crustacean species, female caramote prawns reach larger sizes than males.

This species shows a peak of females in mature stage (stage IV) in autumn. However, there was no catch in October and November although samplings were conducted. This lack of data was probably due to females swimming to shallower depths that are not covered by our sampling design during this period. During winter females were in resting stage (stage II). The reproductive period and gonadosomatic index graph is not presented for this species since the few data available do not cover its peak reproductive period.

Bottom trawling by port

In this section, for each depth range (i.e. continental shelf, upper slope and lower slope), maps, catch composition, species with most biomass landed, species with most biomass discarded and categories with higher mass debris of the ports where bottom trawling samplings were conducted during 2021 are shown.

From north to south, the ports are: Roses (Fig. 31 to 35), Palamós (Fig. 36 to 40), Blanes (Fig. 41 to 45), Arenys de Mar (Fig. 46 to 50), Barcelona (Fig. 51 to 55), Vilanova i la Geltrú (Fig. 56 to 60), Tarragona (Fig. 61 to 65), L'Ametlla de Mar (Fig. 66 to 70) and La Ràpita (Fig. 71 to 75).

Roses

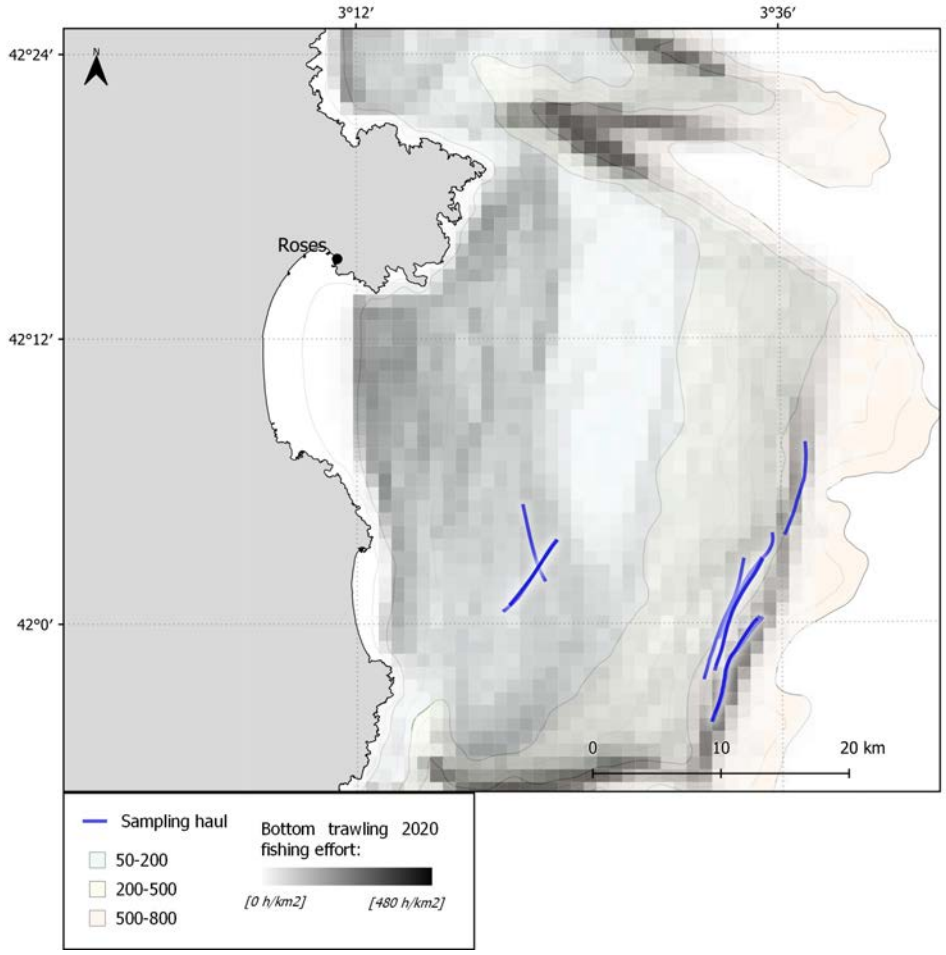


Figure 31. Roses sampling trawls in 2021.

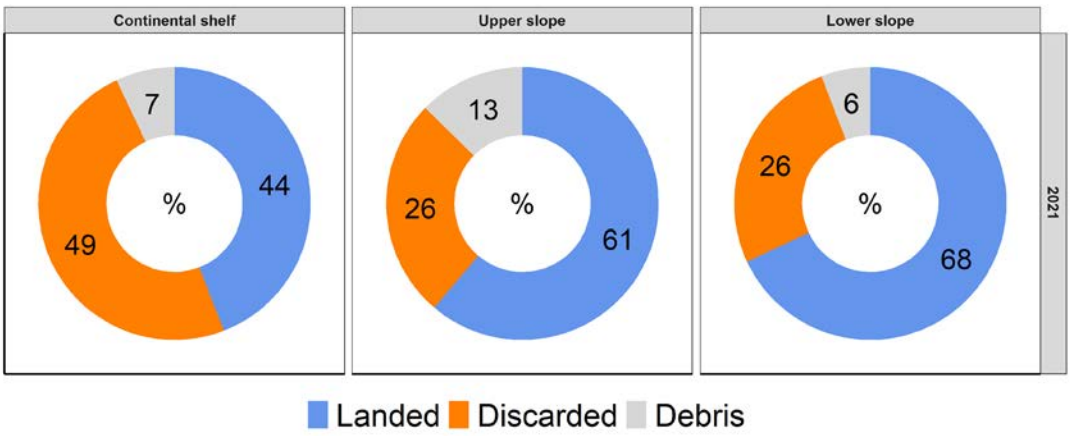
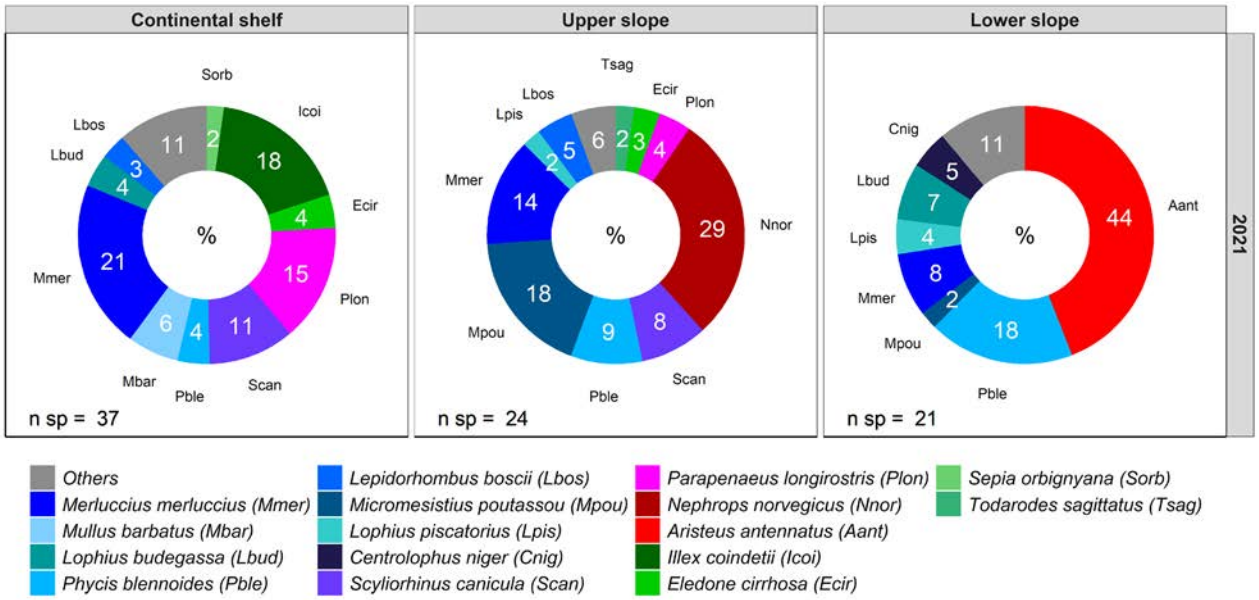


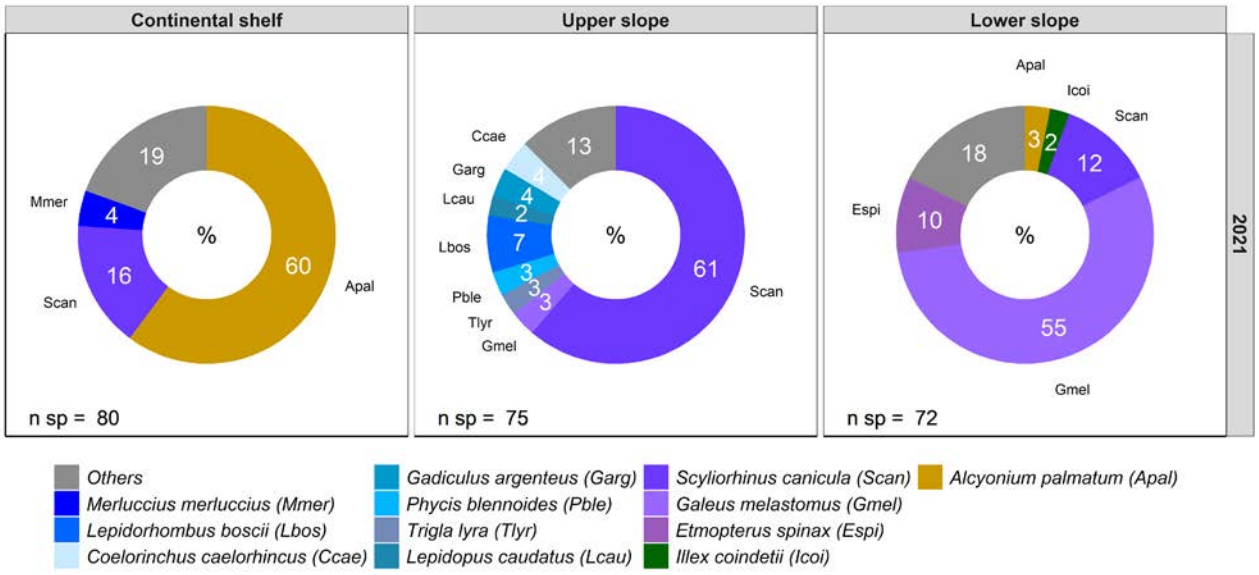
Figure 32. Roses catch composition. Percentage by weight of landings, discarded and debris fraction in each depth strata including all hauls in 2021.

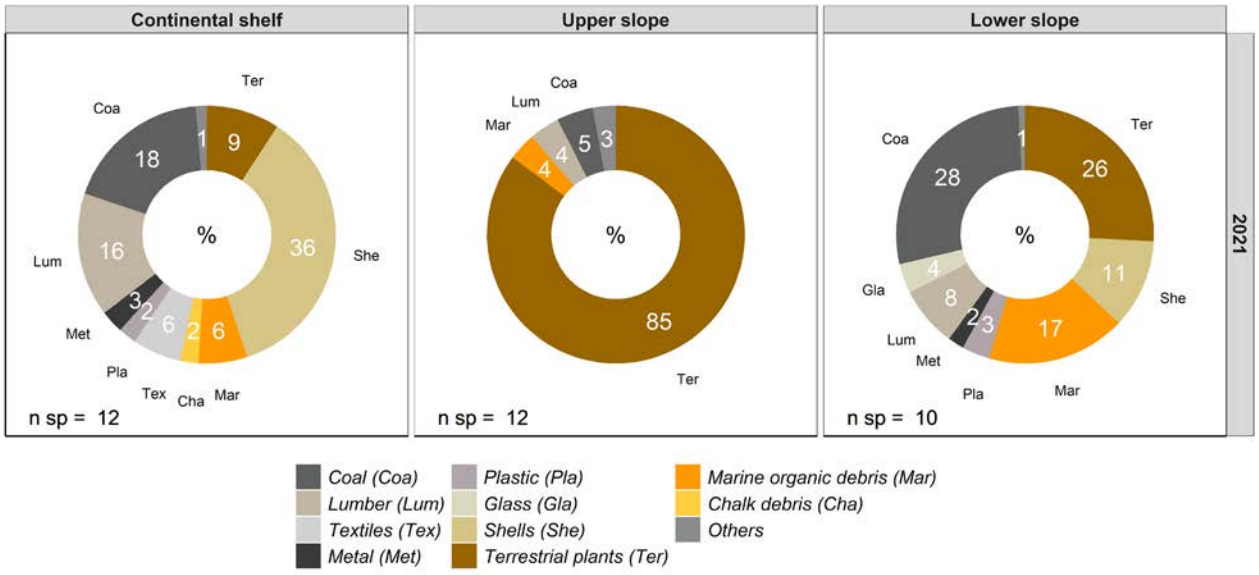
Figure 33. Roses species with most biomass landed in 2021 (next page, top).

Figure 34. Roses species with most biomass discarded in 2021 (next page, center).

Figure 35. Roses cathegories with higher mass debris in 2021 (next page, bottom).


Continental shelf
Upper slope
Lower slope
2021
Sorb
Icoi
Ecir
Plon
Mbar
Pble
Scan
Mmer
Lbud
Lbos
Tsag
Lpis
Nnor
Mpou
Cnig
Aant
n sp = 37
n sp = 24
n sp = 21
Others
Merluccius merluccius (Mmer)
Mullus barbatus (Mbar)
Lophius budegassa (Lbud)
Phycis blennoides (Pble)
Lepidorhombus boscii (Lbos)
Micromesistius poutassou (Mpou)
Lophius piscatorius (Lpis)
Centrolophus niger (Cnig)
Scyliorhinus canicula (Scan)
Parapenaeus longirostris (Plon)
Nephrops norvegicus (Nnor)
Aristeus antennatus (Aant)
Illex coindetii (Icoi)
Eledone cirrhosa (Ecir)
Sepia orbignyana (Sorb)
Todarodes sagittatus (Tsag)


Continental shelf
Upper slope
Lower slope
2021
Mmer
Scan
Apal
Ccae
Garg
Lcau
Lbos
Pble
Tlyr
Gmel
Espi
n sp = 80
n sp = 75
n sp = 72
Others
Merluccius merluccius (Mmer)
Lepidorhombus boscii (Lbos)
Coelorinchus caelorhincus (Ccae)
Gadiculus argenteus (Garg)
Phycis blennoides (Pble)
Trigla lyra (Tlyr)
Lepidopus caudatus (Lcau)
Scyliorhinus canicula (Scan)
Galeus melastomus (Gmel)
Etmopterus spinax (Espi)
Illex coindetii (Icoi)
Alcyonium palmatum (Apal)


Continental shelf
Upper slope
Lower slope
2021
Coa
Ter
She
Lum
Met
Pla
Tex
Cha
Mar
Gla
n sp = 12
n sp = 12
n sp = 10
Coal (Coa)
Lumber (Lum)
Textiles (Tex)
Metal (Met)
Plastic (Pla)
Glass (Gla)
Shells (She)
Terrestrial plants (Ter)
Marine organic debris (Mar)
Chalk debris (Cha)
Others

Palamós

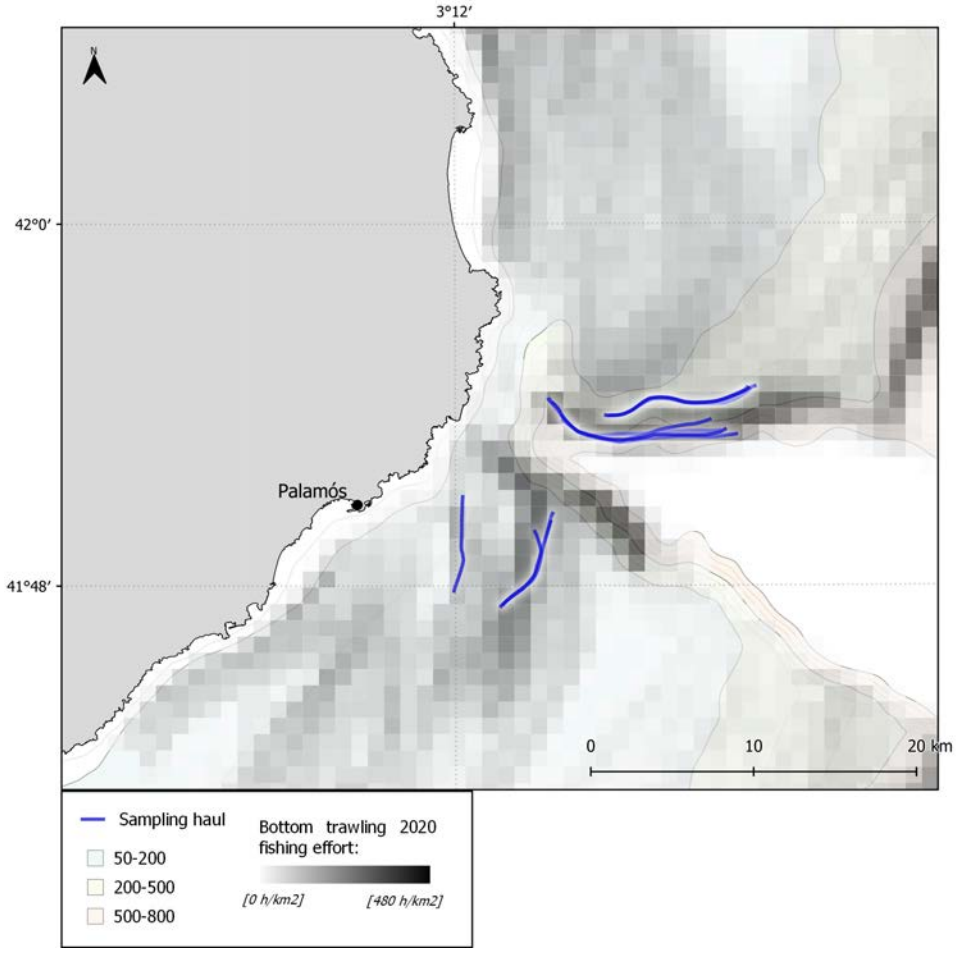


Figure 36. Palamós sampling trawls in 2021.

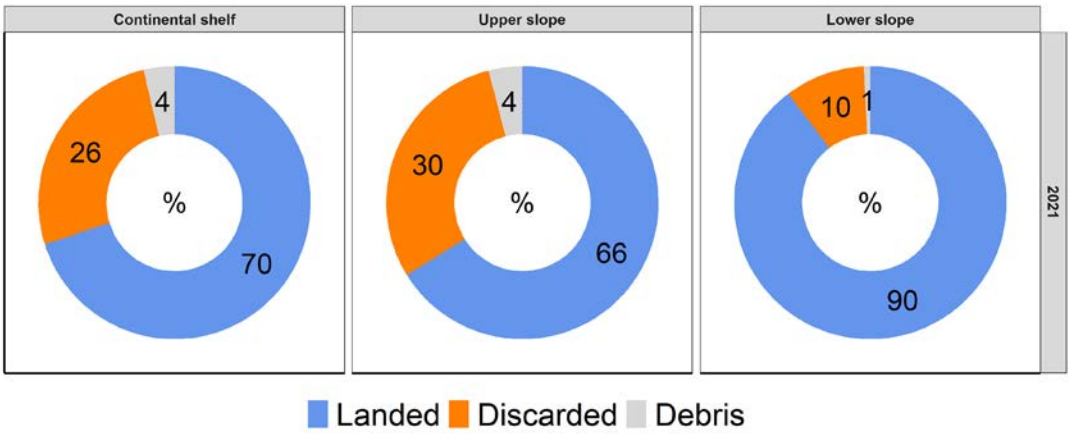
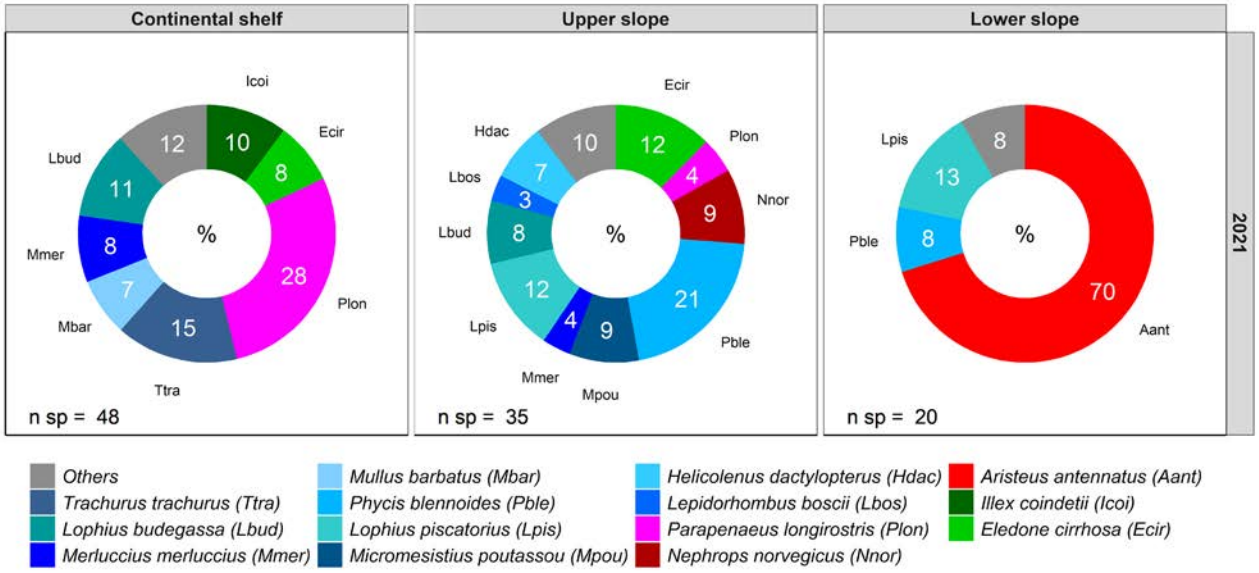


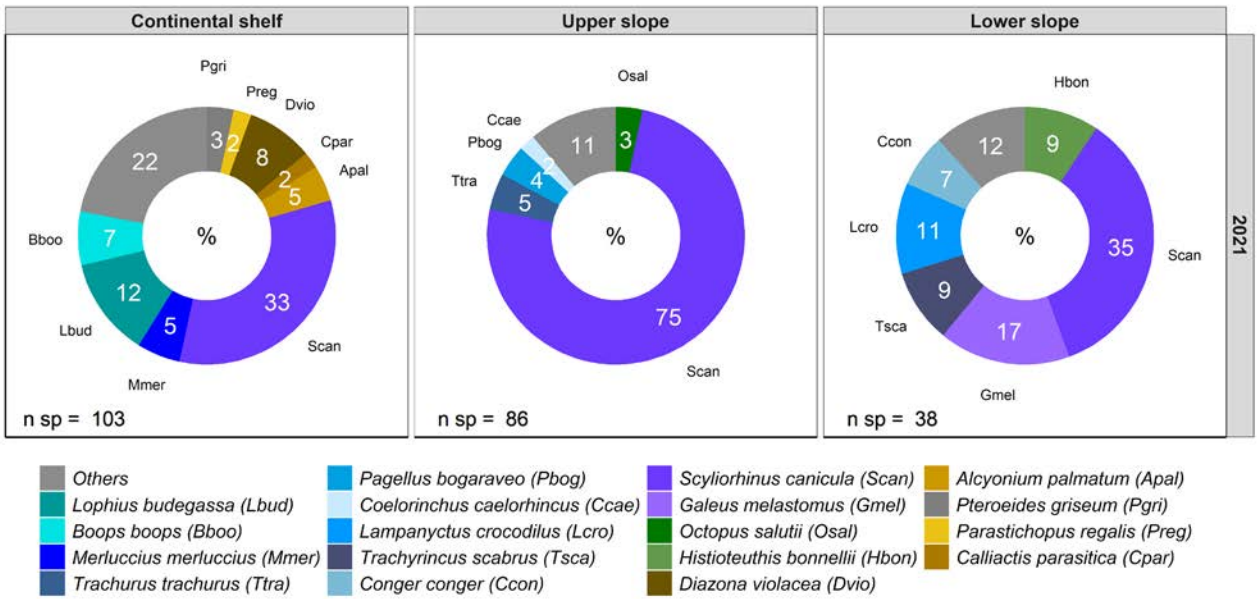
Figure 37. Palamós catch composition. Percentage by weight of landings, discarded and debris fraction in each depth strata including all hauls in 2021.

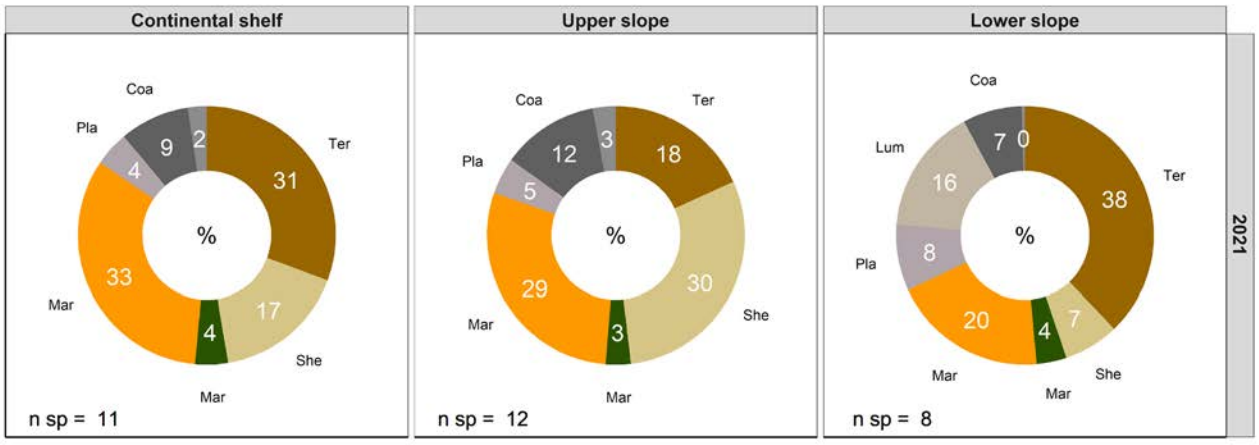
Figure 38. Palamós species with most biomass landed in 2021 (next page, top).

Figure 39. Palamós species with most biomass discarded in 2021 (next page, center).

Figure 40. Palamós cathegories with higher mass debris in 2021 (next page, bottom).


Continental shelf
Upper slope
Lower slope
2021
Icoi
Ecir
Lbud
Mmer
Mbar
Ttra
Plon
Hdac
Lbos
Lpis
Mmer
Mpou
Pble
Nnor
Lpis
Pble
Aant
%
n sp = 48
n sp = 35
n sp = 20
Others
Trachurus trachurus (Ttra)
Lophius budegassa (Lbud)
Merluccius merluccius (Mmer)
Mullus barbatus (Mbar)
Phycis blennoides (Pble)
Lophius piscatorius (Lpis)
Micromesistius poutassou (Mpou)
Helicolenus dactylopterus (Hdac)
Lepidorhombus boscii (Lbos)
Parapenaeus longirostris (Plon)
Nephrops norvegicus (Nnor)
Aristeus antennatus (Aant)
Illex coindetii (Icoi)
Eledone cirrhosa (Ecir)


Continental shelf
Upper slope
Lower slope
2021
Pgri
Preg
Dvio
Cpar
Apal
Bboo
Lbud
Mmer
Scan
Osal
Ccae
Pbog
Ttra
Scan
Hbon
Ccon
Lcro
Tsca
Gmel
Scan
%
n sp = 103
n sp = 86
n sp = 38
Others
Lophius budegassa (Lbud)
Boops boops (Bboo)
Merluccius merluccius (Mmer)
Trachurus trachurus (Ttra)
Pagellus bogaraveo (Pbog)
Coelorinchus caelorhincus (Ccae)
Lampanyctus crocodilus (Lcro)
Trachyrincus scabrus (Tsca)
Conger conger (Ccon)
Scyliorhinus canicula (Scan)
Galeus melastomus (Gmel)
Octopus salutii (Osal)
Histioteuthis bonnellii (Hbon)
Diazona violacea (Dvio)
Alcyonium palmatum (Apal)
Pteroeides griseum (Pgri)
Parastichopus regalis (Preg)
Calliactis parasitica (Cpar)


Continental shelf
Upper slope
Lower slope
2021
Coa
Pla
Ter
Mar
She
Mar
Coa
Ter
Pla
Mar
She
Mar
Coa
Lum
Ter
Pla
Mar
She
Mar
%
n sp = 11
n sp = 12
n sp = 8
Coal (Coa)
Plastic (Pla)
Lumber (Lum)
Marine organic debris (Mar)
Terrestrial plants (Ter)
Shells (She)
Marine plants (Mar)
Others

Blanes

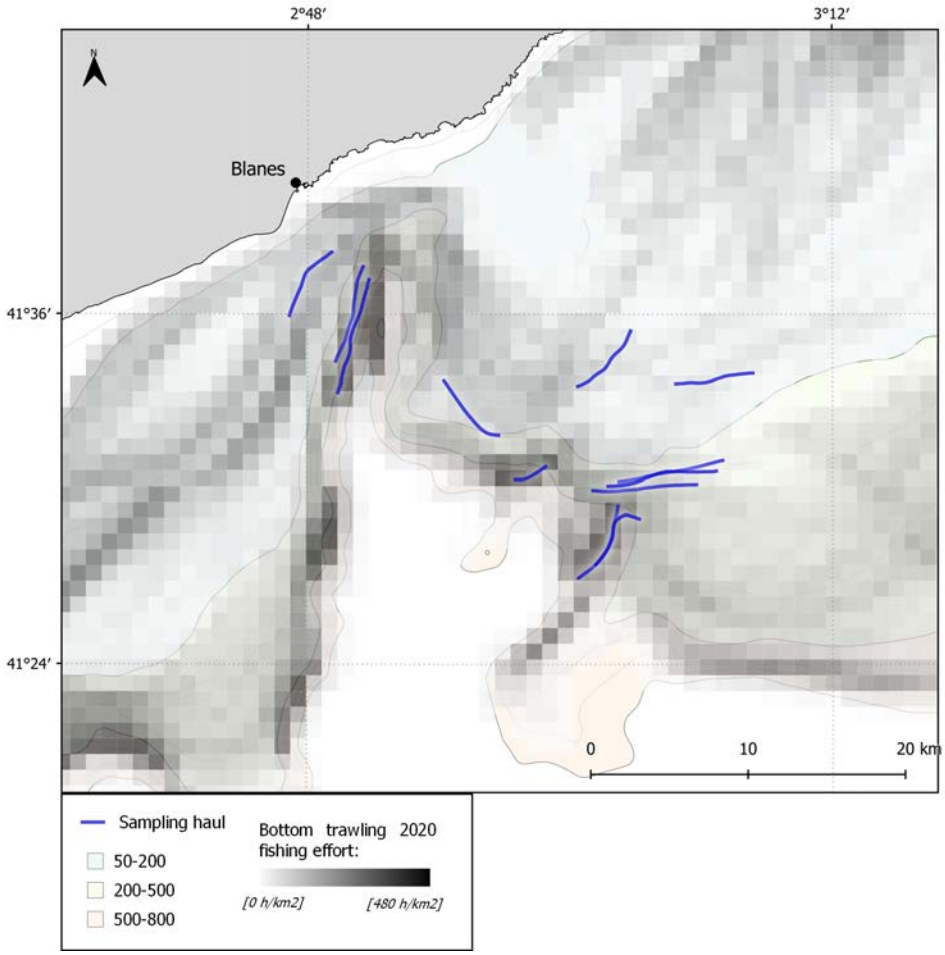


Figure 41. Blanes sampling trawls in 2021.

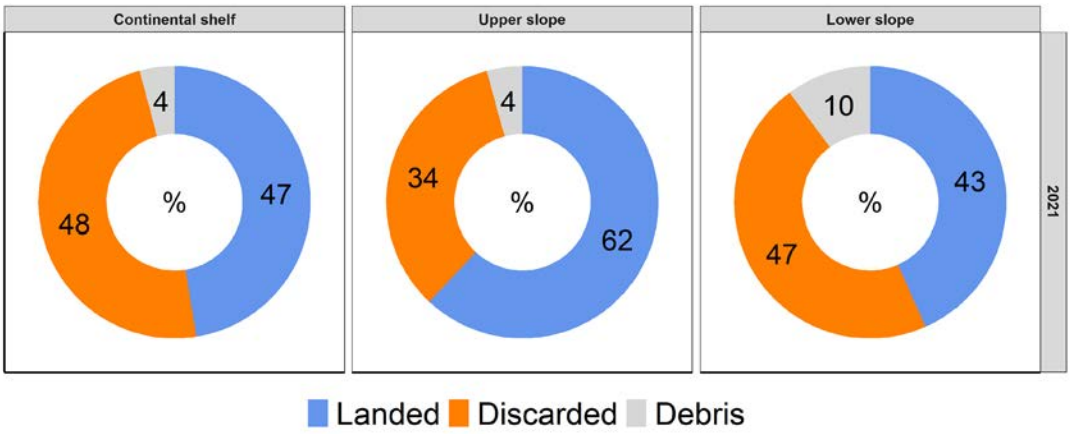
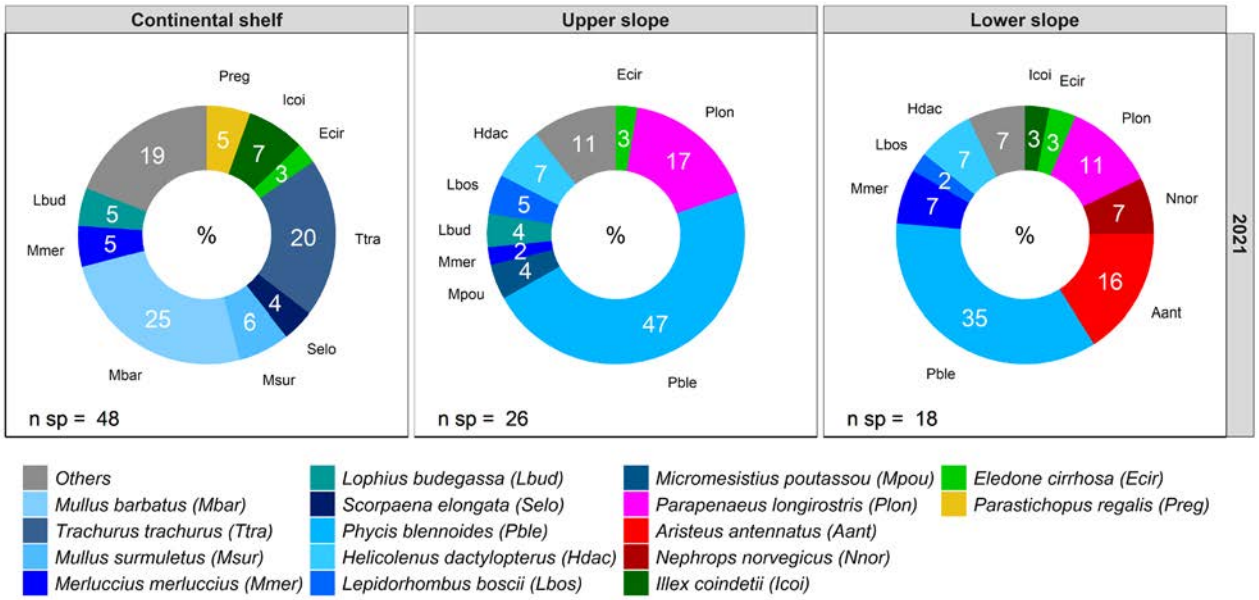


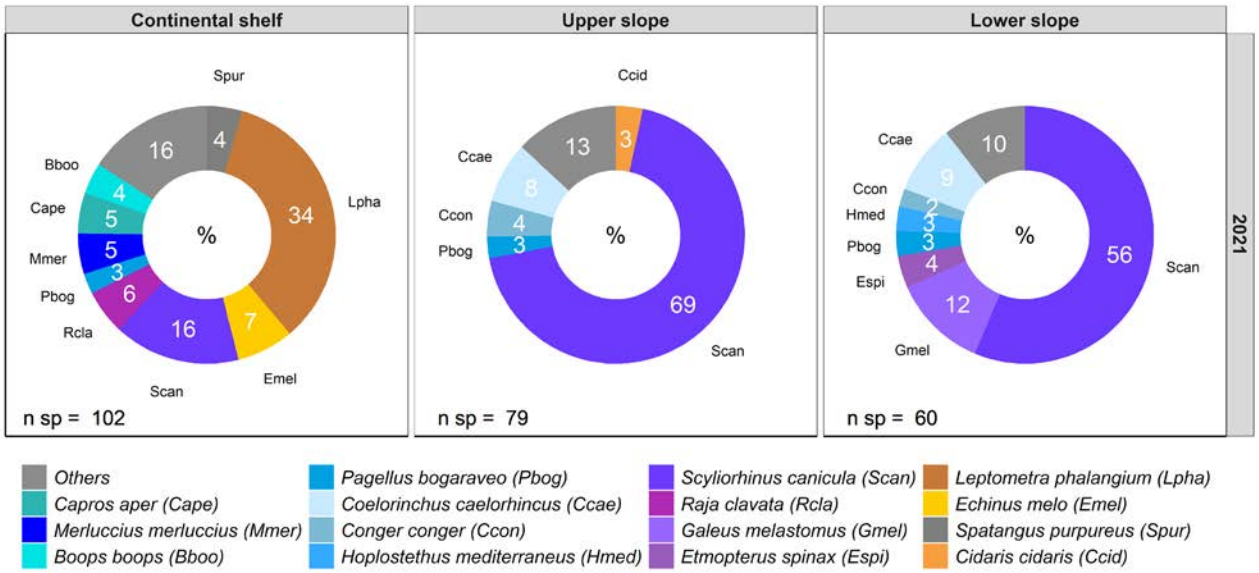
Figure 42. Blanes catch composition. Percentage by weight of landings, discarded and debris fraction in each depth strata including all hauls in 2021.

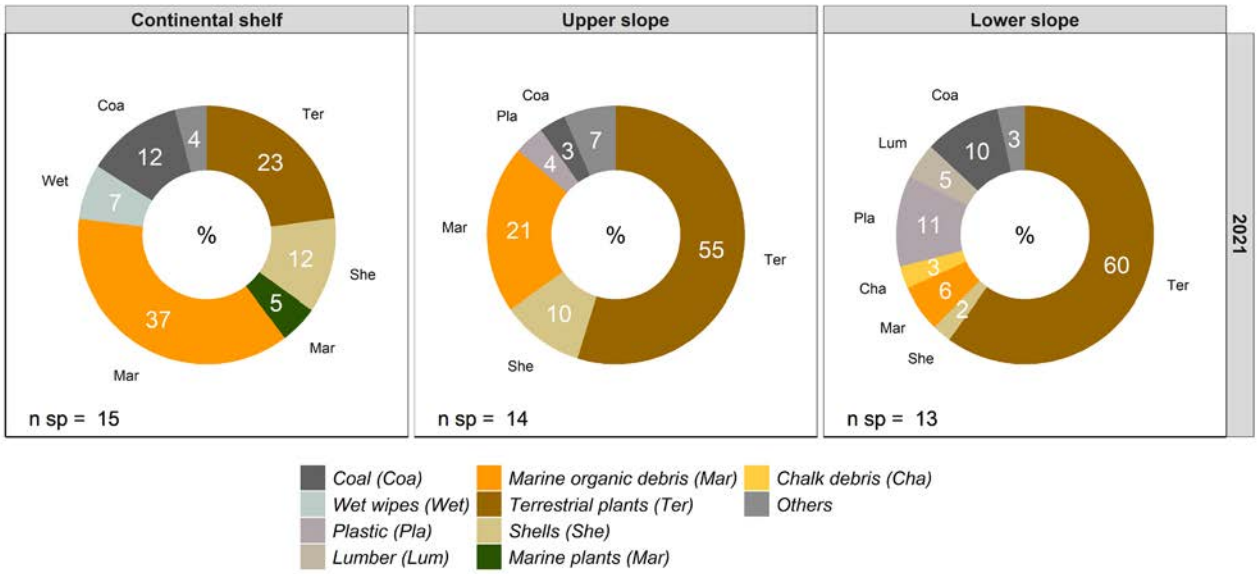
Figure 43. Blanes species with most biomass landed in 2021 (next page, top).

Figure 44. Blanes species with most biomass discarded in 2021 (next page, center).

Figure 45. Blanes cathegories with higher mass debris in 2021 (next page, bottom).


Continental shelf
Upper slope
Lower slope
2021
Preg
Icoi
Ecir
Lbud
Mmer
Ttra
Selo
Mbar
Msur
Hdac
Lbos
Mpou
Pble
Plon
Nnor
Aant
n sp = 48
n sp = 26
n sp = 18
Others
Mullus barbatus (Mbar)
Trachurus trachurus (Ttra)
Mullus surmuletus (Msur)
Merluccius merluccius (Mmer)
Lophius budegassa (Lbud)
Scorpaena elongata (Selo)
Phycis blennoides (Pble)
Helicolenus dactylopterus (Hdac)
Lepidorhombus boscii (Lbos)
Micromesistius poutassou (Mpou)
Parapenaeus longirostris (Plon)
Aristeus antennatus (Aant)
Nephrops norvegicus (Nnor)
Illex coindetii (Icoi)
Eledone cirrhosa (Ecir)
Parastichopus regalis (Preg)


Continental shelf
Upper slope
Lower slope
2021
Spur
Bboo
Cape
Lpha
Mmer
Pbog
Rcla
Scan
Emel
Ccid
Ccae
Ccon
Hmed
Espi
Gmel
n sp = 102
n sp = 79
n sp = 60
Others
Capros aper (Cape)
Merluccius merluccius (Mmer)
Boops boops (Bboo)
Pagellus bogaraveo (Pbog)
Coelorinchus caelorhincus (Ccae)
Conger conger (Ccon)
Hoplostethus mediterraneus (Hmed)
Scyliorhinus canicula (Scan)
Raja clavata (Rcla)
Galeus melastomus (Gmel)
Etmopterus spinax (Espi)
Leptometra phalangium (Lpha)
Echinus melo (Emel)
Spatangus purpureus (Spur)
Cidaris cidaris (Ccid)


Continental shelf
Upper slope
Lower slope
2021
Coa
Ter
Wet
She
Mar
Pla
Lum
Cha
n sp = 15
n sp = 14
n sp = 13
Coal (Coa)
Wet wipes (Wet)
Plastic (Pla)
Lumber (Lum)
Marine organic debris (Mar)
Terrestrial plants (Ter)
Shells (She)
Marine plants (Mar)
Chalk debris (Cha)
Others

Arenys de Mar

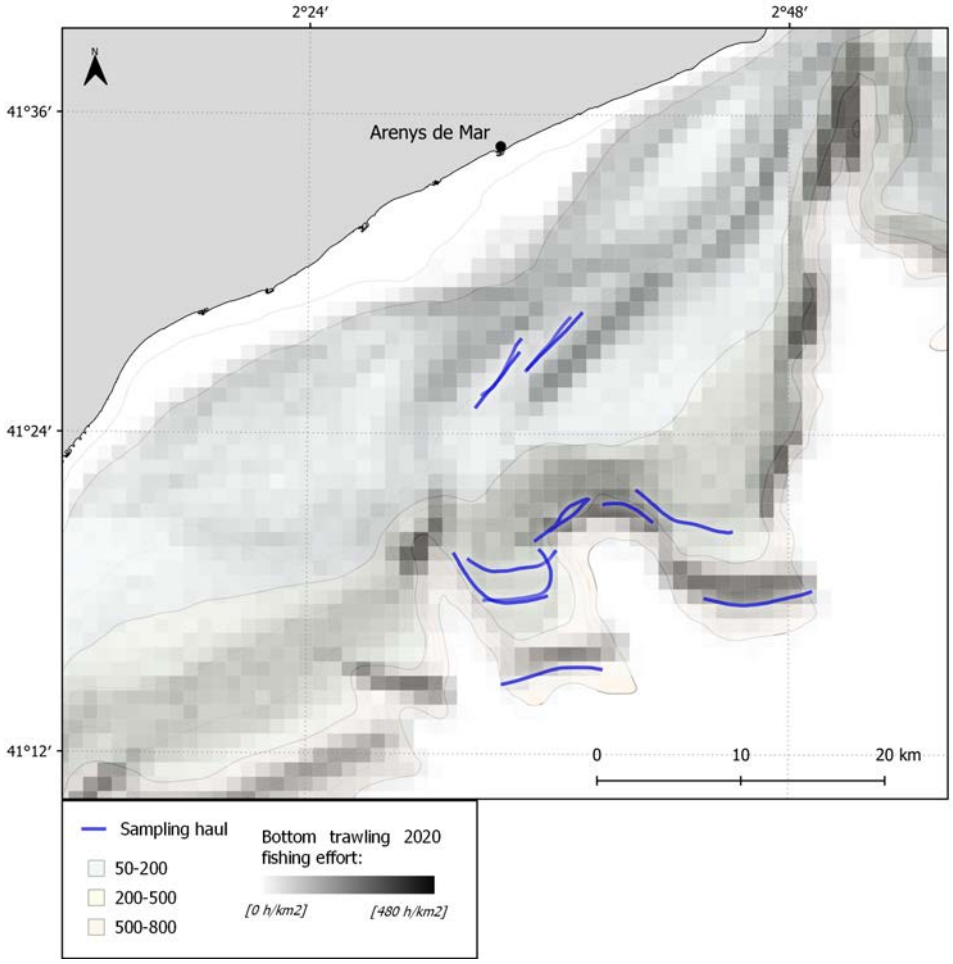


Figure 46. Arenys de Mar sampling trawls in 2021.

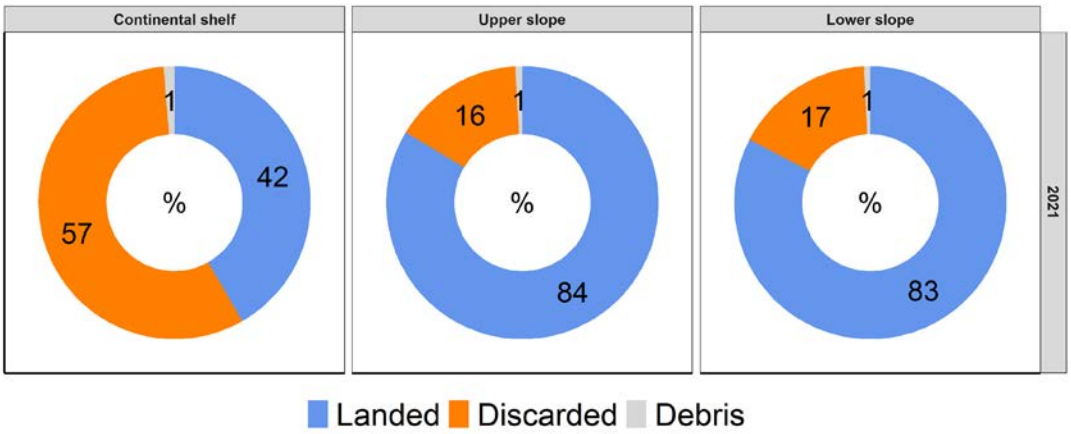
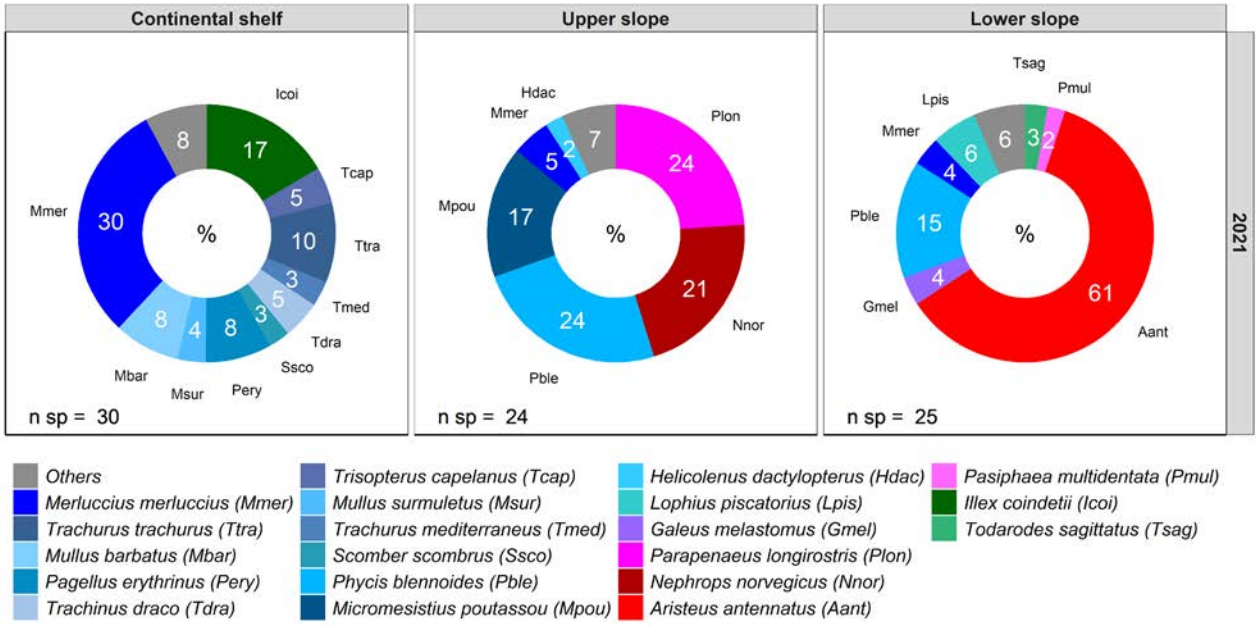


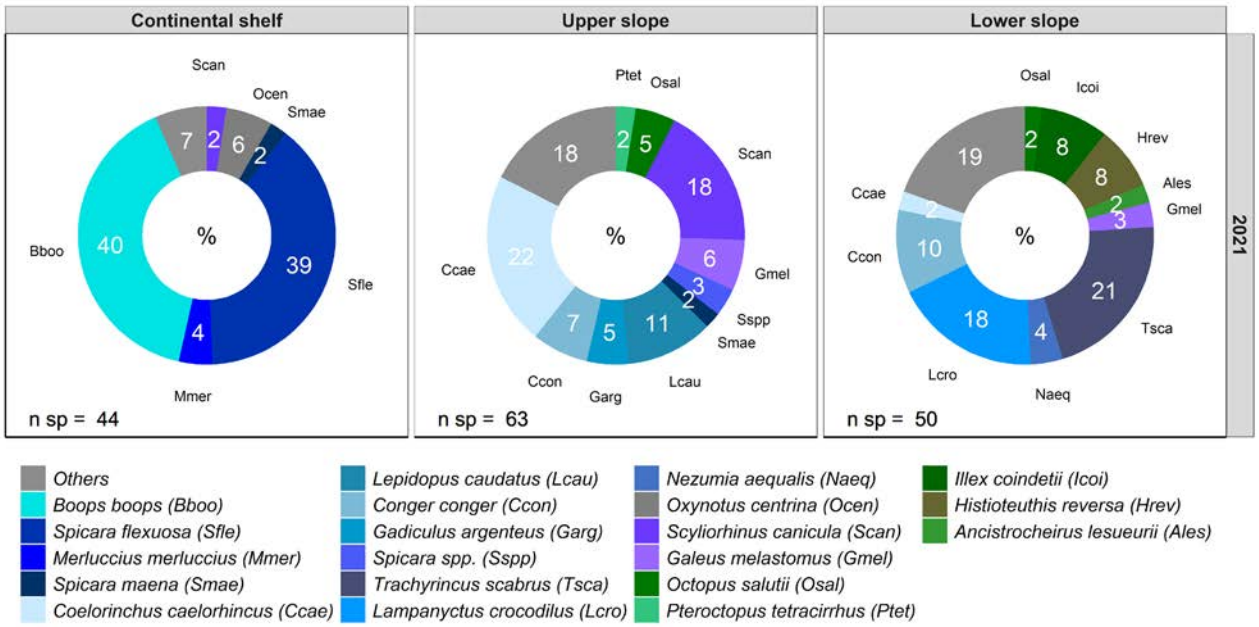
Figure 47. Arenys de Mar catch composition. Percentage by weight of landings, discarded and debris fraction in each depth strata including all hauls in 2021.

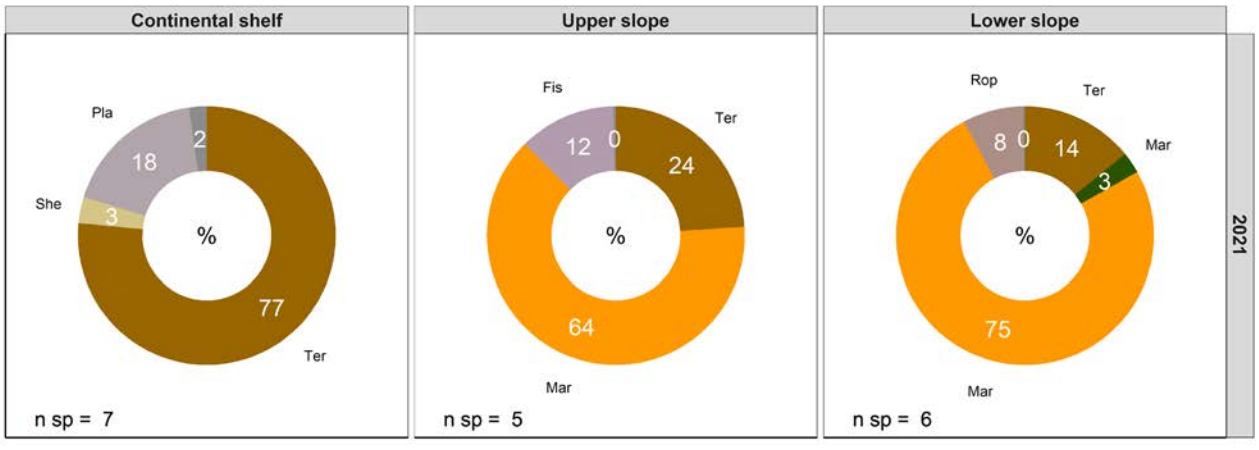
Figure 48. Arenys de Mar species with most biomass landed in 2021 (next page, top).

Figure 49. Arenys de Mar species with most biomass discarded in 2021 (next page, center).

Figure 50. Arenys de Mar cathegories with higher mass debris in 2021 (next page, bottom).


Continental shelf
Upper slope
Lower slope
2021
Icoi
Tcap
Ttra
Tmed
Tdra
Ssco
Pery
Msur
Mbar
Mmer
Hdac
Plon
Nnor
Pble
Mpou
Tsag
Pmul
Lpis
Aant
Gmel
n sp = 30
n sp = 24
n sp = 25
Others
Merluccius merluccius (Mmer)
Trachurus trachurus (Ttra)
Mullus barbatus (Mbar)
Pagellus erythrinus (Pery)
Trachinus draco (Tdra)
Trisopterus capelanus (Tcap)
Mullus surmuletus (Msur)
Trachurus mediterraneus (Tmed)
Scomber scombrus (Ssco)
Phycis blennoides (Pble)
Micromesistius poutassou (Mpou)
Helicolenus dactylopterus (Hdac)
Lophius piscatorius (Lpis)
Galeus melastomus (Gmel)
Parapenaeus longirostris (Plon)
Nephrops norvegicus (Nnor)
Aristeus antennatus (Aant)
Pasiphaea multidentata (Pmul)
Illex coindetii (Icoi)
Todarodes sagittatus (Tsag)


Continental shelf
Upper slope
Lower slope
2021
Scan
Ocen
Smae
Bboo
Sfle
Mmer
Ptet
Osal
Ccae
Gmel
Sspp
Smae
Ccon
Garg
Lcau
Icoi
Hrev
Ales
Ccon
Tsca
Lcro
Naeq
n sp = 44
n sp = 63
n sp = 50
Others
Boops boops (Bboo)
Spicara flexuosa (Sfle)
Merluccius merluccius (Mmer)
Spicara maena (Smae)
Coelorinchus caelorhincus (Ccae)
Lepidopus caudatus (Lcau)
Conger conger (Ccon)
Gadiculus argenteus (Garg)
Spicara spp. (Sspp)
Trachyrincus scabrus (Tsca)
Lampanyctus crocodilus (Lcro)
Nezumia aequalis (Naeq)
Oxynotus centrina (Ocen)
Scyliorhinus canicula (Scan)
Galeus melastomus (Gmel)
Octopus salutii (Osal)
Pteroctopus tetracirrhus (Ptet)
Illex coindetii (Icoi)
Histioteuthis reversa (Hrev)
Ancistrocheirus lesueurii (Ales)


Continental shelf
Upper slope
Lower slope
2021
Pla
She
Ter
Fis
Mar
Rop
n sp = 7
n sp = 5
n sp = 6
Plastic (Pla)
Fishing gear (Fis)
Ropes (Rop)
Terrestrial plants (Ter)
Shells (She)
Marine organic debris (Mar)
Marine plants (Mar)
Others

Barcelona

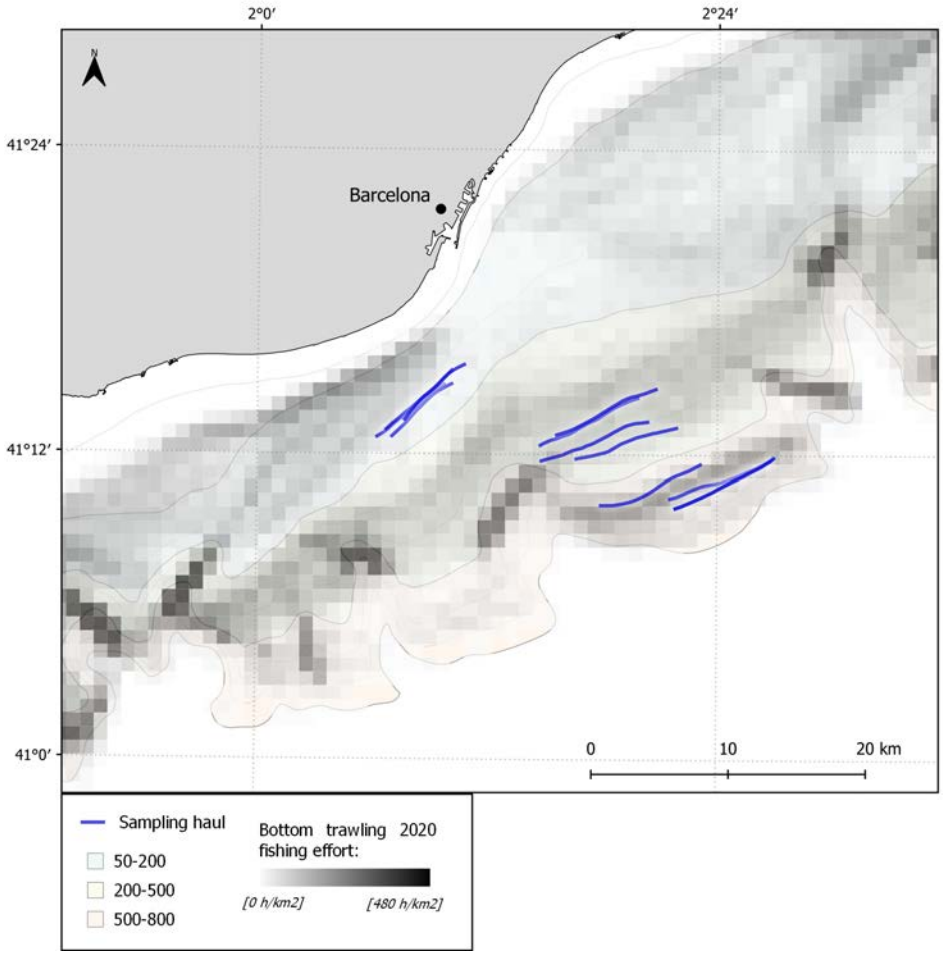


Figure 51. Barcelona sampling trawls in 2021.

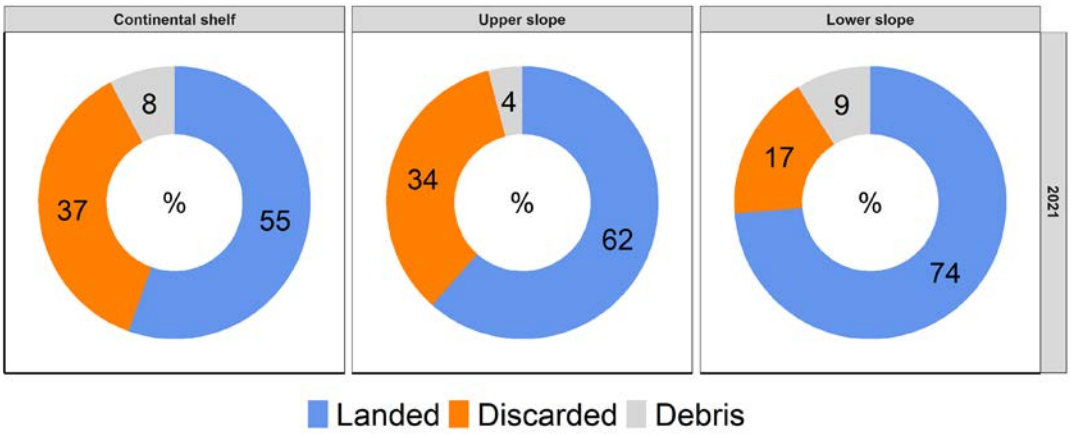
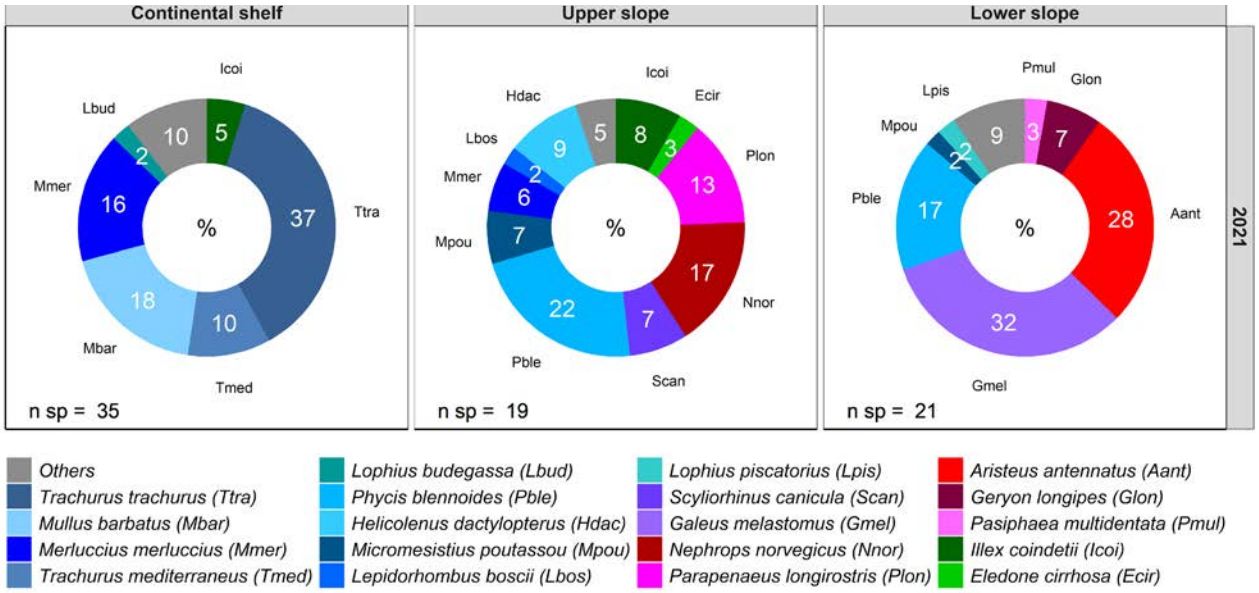


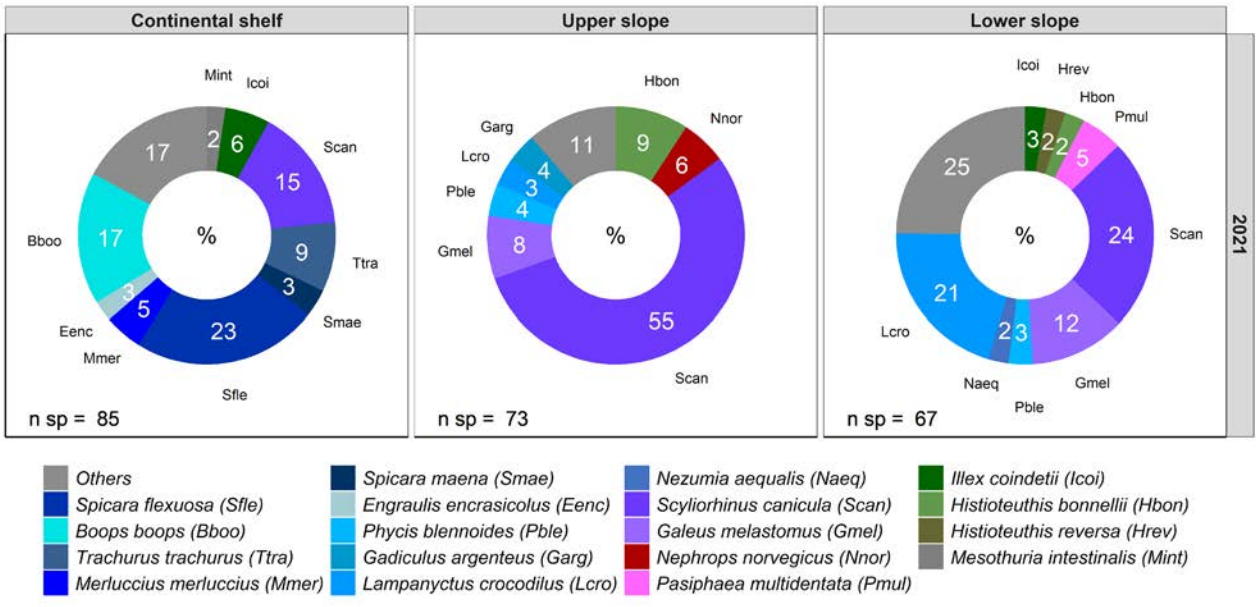
Figure 52. Barcelona catch composition. Percentage by weight of landings, discarded and debris fraction in each depth strata including all hauls in 2021.

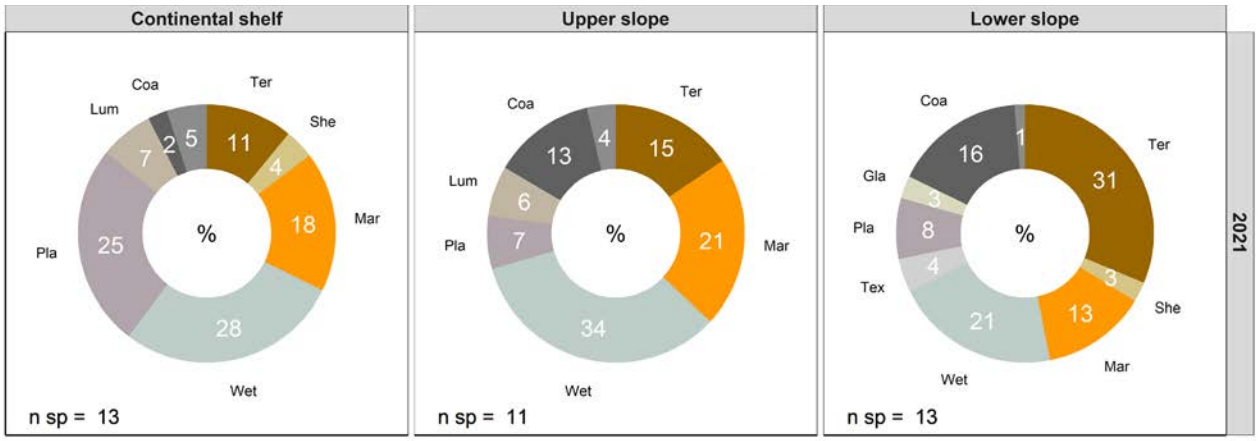
Figure 53. Barcelona species with most biomass landed in 2021 (next page, top).

Figure 54. Barcelona species with most biomass discarded in 2021 (next page, center).

Figure 55. Barcelona cathegories with higher mass debris in 2021 (next page, bottom).


Continental shelf
Upper slope
Lower slope
2021
Icoi
Lbud
Mmer
Ttra
Mbar
Tmed
Hdac
Lbos
Plon
Nnor
Pble
Scan
Pmul
Glon
Lpis
Mpou
Aant
Gmel
%
n sp = 35
n sp = 19
n sp = 21
Others
Trachurus trachurus (Ttra)
Mullus barbatus (Mbar)
Merluccius merluccius (Mmer)
Trachurus mediterraneus (Tmed)
Lophius budegassa (Lbud)
Phycis blennoides (Pble)
Helicolenus dactylopterus (Hdac)
Micromesistius poutassou (Mpou)
Lepidorhombus boscii (Lbos)
Lophius piscatorius (Lpis)
Scyliorhinus canicula (Scan)
Galeus melastomus (Gmel)
Nephrops norvegicus (Nnor)
Parapenaeus longirostris (Plon)
Aristeus antennatus (Aant)
Geryon longipes (Glon)
Pasiphaea multidentata (Pmul)
Illex coindetii (Icoi)
Eledone cirrhosa (Ecir)


Continental shelf
Upper slope
Lower slope
2021
Mint
Icoi
Scan
Ttra
Smae
Sfle
Mmer
Eenc
Bboo
Hbon
Nnor
Garg
Lcro
Pble
Gmel
Scan
Hrev
Hbon
Pmul
Scan
Lcro
Naeq
Gmel
Pble
%
n sp = 85
n sp = 73
n sp = 67
Others
Spicara flexuosa (Sfle)
Boops boops (Bboo)
Trachurus trachurus (Ttra)
Merluccius merluccius (Mmer)
Spicara maena (Smae)
Engraulis encrasicolus (Eenc)
Phycis blennoides (Pble)
Gadiculus argenteus (Garg)
Lampanyctus crocodilus (Lcro)
Nezumia aequalis (Naeq)
Scyliorhinus canicula (Scan)
Galeus melastomus (Gmel)
Nephrops norvegicus (Nnor)
Pasiphaea multidentata (Pmul)
Illex coindetii (Icoi)
Histioteuthis bonnellii (Hbon)
Histioteuthis reversa (Hrev)
Mesothuria intestinalis (Mint)


Continental shelf
Upper slope
Lower slope
2021
Coa
Ter
Lum
She
Mar
Pla
Wet
%
n sp = 13
n sp = 11
n sp = 13
Tex
Gla
Wet wipes (Wet)
Plastic (Pla)
Lumber (Lum)
Coal (Coa)
Textiles (Tex)
Glass (Gla)
Marine organic debris (Mar)
Terrestrial plants (Ter)
Shells (She)
Others

Vilanova i la Geltrú

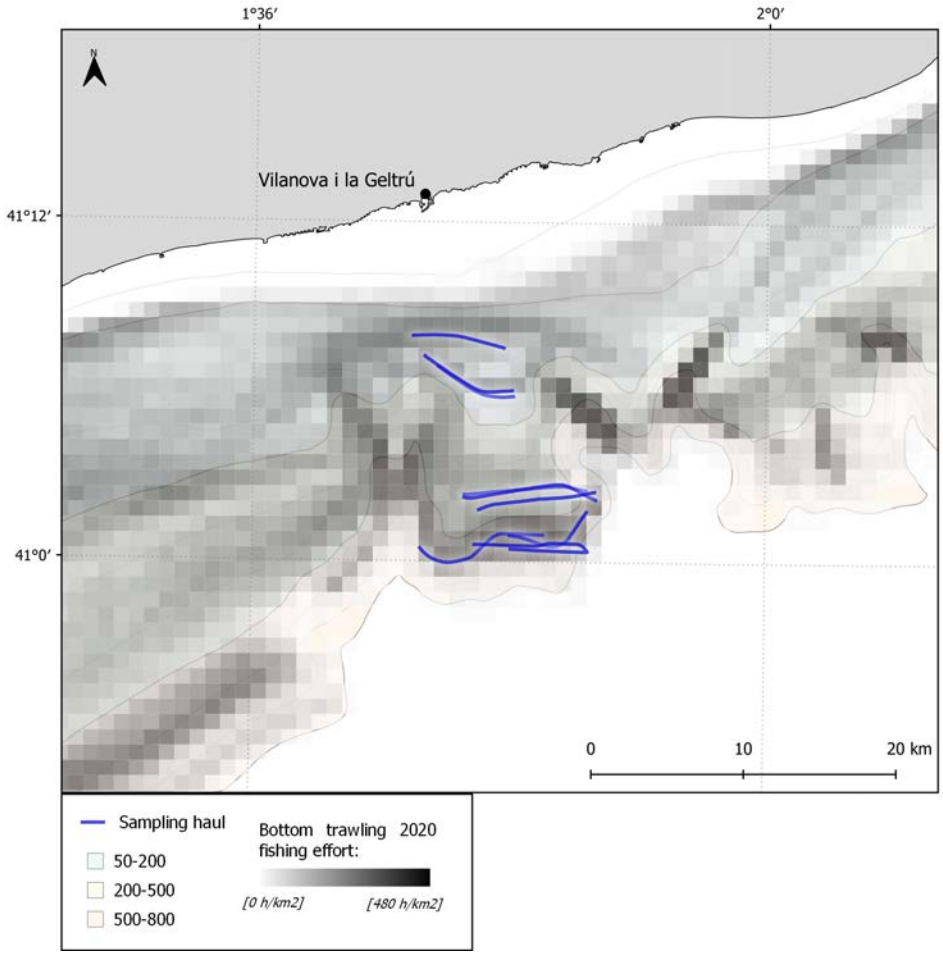


Figure 56. Vilanova i la Geltrú sampling trawls in 2021.

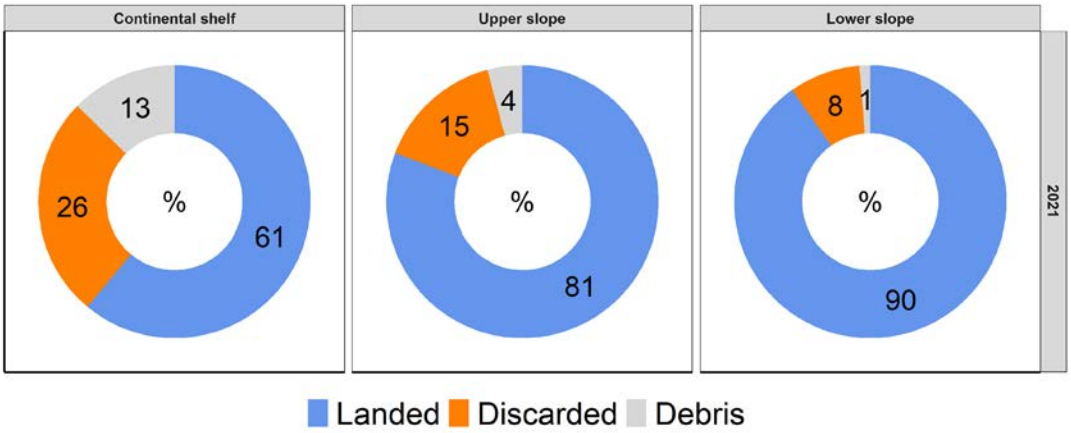
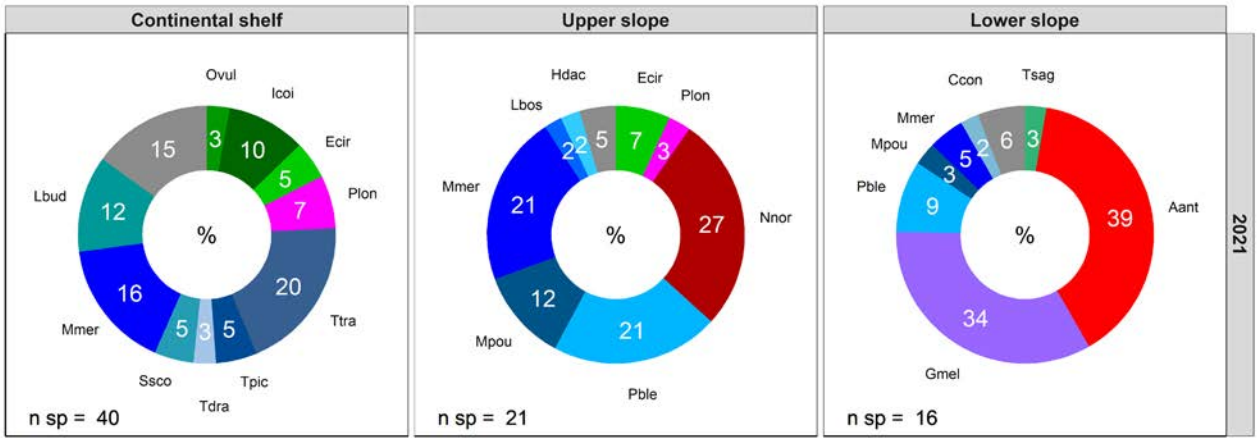


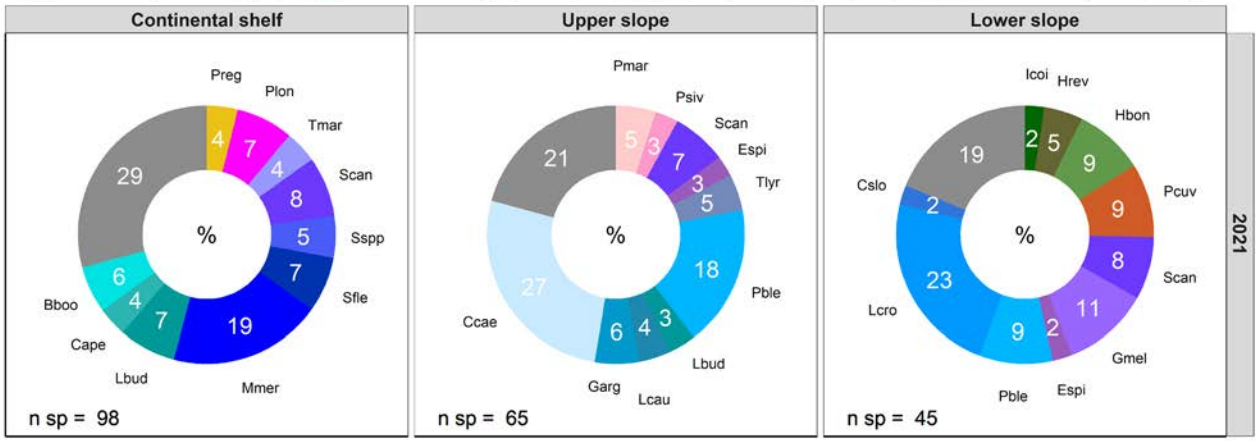
Figure 57. Vilanova i la Geltrú catch composition. Percentage by weight of landings, discarded and debris fraction in each depth strata including all hauls in 2021.

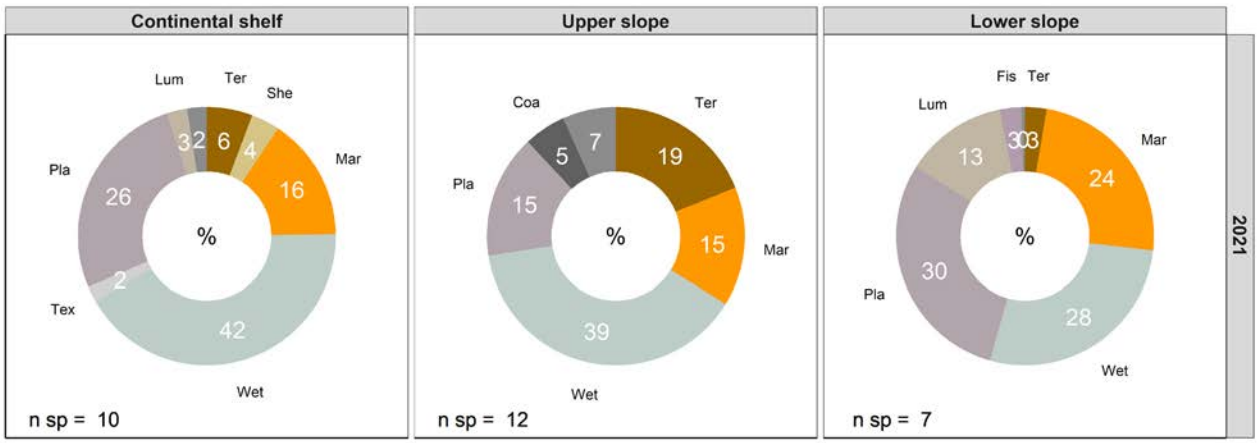
Figure 58. Vilanova i la Geltrú species with most biomass landed in 2021 (next page, top).

Figure 59. Vilanova i la Geltrú species with most biomass discarded in 2021 (next page, center).

Figure 60. Vilanova i la Geltrú cathegories with higher mass debris in 2021 (next page, bottom).


Continental shelf
Upper slope
Lower slope
2021
Ovul
Icoi
Ecir
Plon
Ttra
Tpic
Tdra
Ssco
Mmer
Lbud
n sp = 40
Hdac
Ecir
Plon
Lbos
Mmer
Nnor
Mpou
Pble
n sp = 21
Ccon
Tsag
Mmer
Mpou
Pble
Aant
Gmel
n sp = 16
Others
Trachurus trachurus (Ttra)
Merluccius merluccius (Mmer)
Lophius budegassa (Lbud)
Trachurus picturatus (Tpic)
Scomber scombrus (Ssco)
Trachinus draco (Tdra)
Phycis blennoides (Pble)
Micromesistius poutassou (Mpou)
Helicolenus dactylopterus (Hdac)
Lepidorhombus boscii (Lbos)
Conger conger (Ccon)
Galeus melastomus (Gmel)
Parapenaeus longirostris (Plon)
Nephrops norvegicus (Nnor)
Aristeus antennatus (Aant)
Illex coindetii (Icoi)
Eledone cirrhosa (Ecir)
Octopus vulgaris (Ovul)
Todarodes sagittatus (Tsag)


Continental shelf
Upper slope
Lower slope
2021
Preg
Plon
Tmar
Scan
Sspp
Sfle
Bboo
Cape
Lbud
Mmer
n sp = 98
Pmar
Psiv
Scan
Espi
Tlyr
Pble
Lbud
Lcau
Garg
Ccae
n sp = 65
Icoi
Hrev
Hbon
Pcuv
Scan
Gmel
Espi
Pble
Lcro
Cslo
n sp = 45
Others
Merluccius merluccius (Mmer)
Lophius budegassa (Lbud)
Spicara flexuosa (Sfle)
Boops boops (Bboo)
Spicara spp. (Sspp)
Capros aper (Cape)
Coelorinchus caelorhincus (Ccae)
Phycis blennoides (Pble)
Gadiculus argenteus (Garg)
Trigla lyra (Tlyr)
Lepidopus caudatus (Lcau)
Lampanyctus crocodilus (Lcro)
Chauliodus sloani (Cslo)
Scyliorhinus canicula (Scan)
Torpedo marmorata (Tmar)
Etmopterus spinax (Espi)
Galeus melastomus (Gmel)
Parapenaeus longirostris (Plon)
Plesionika martia (Pmar)
Pasiphaea sivado (Psiv)
Paromola cuvieri (Pcuv)
Histioteuthis bonnellii (Hbon)
Histioteuthis reversa (Hrev)
Illex coindetii (Icoi)
Parastichopus regalis (Preg)


Continental shelf
Upper slope
Lower slope
2021
Lum
Ter
She
Mar
Pla
Tex
Wet
n sp = 10
Coa
Ter
Pla
Mar
Wet
n sp = 12
Fis
Ter
Lum
Mar
Pla
Wet
n sp = 7
Wet wipes (Wet)
Plastic (Pla)
Lumber (Lum)
Textiles (Tex)
Coal (Coa)
Fishing gear (Fis)
Marine organic debris (Mar)
Terrestrial plants (Ter)
Shells (She)
Others

Tarragona

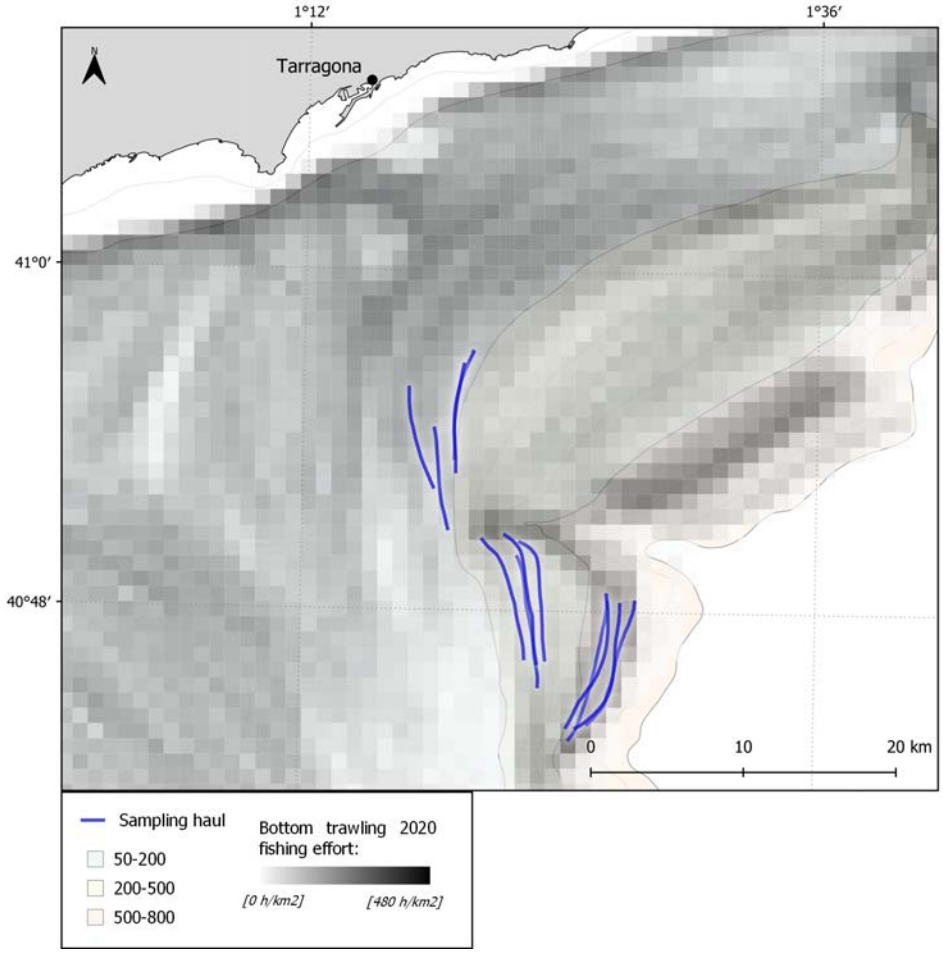


Figure 61. Tarragona sampling trawls in 2021.

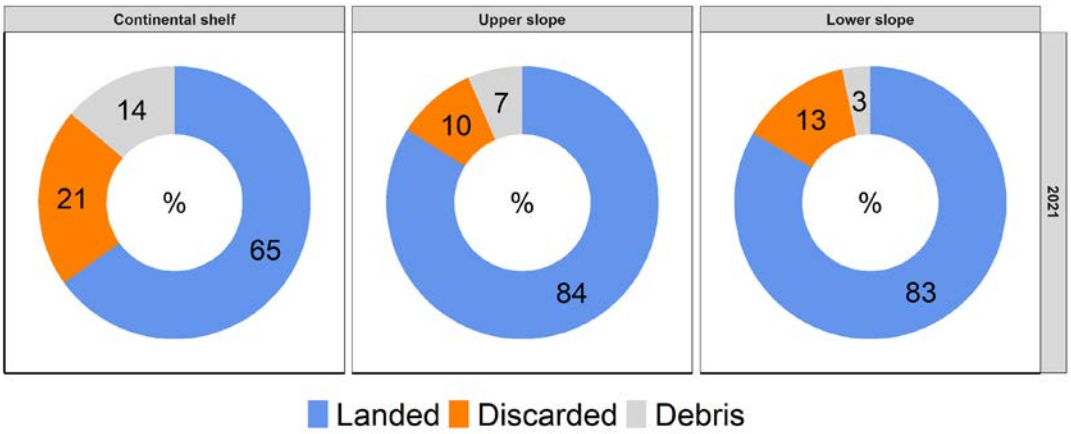
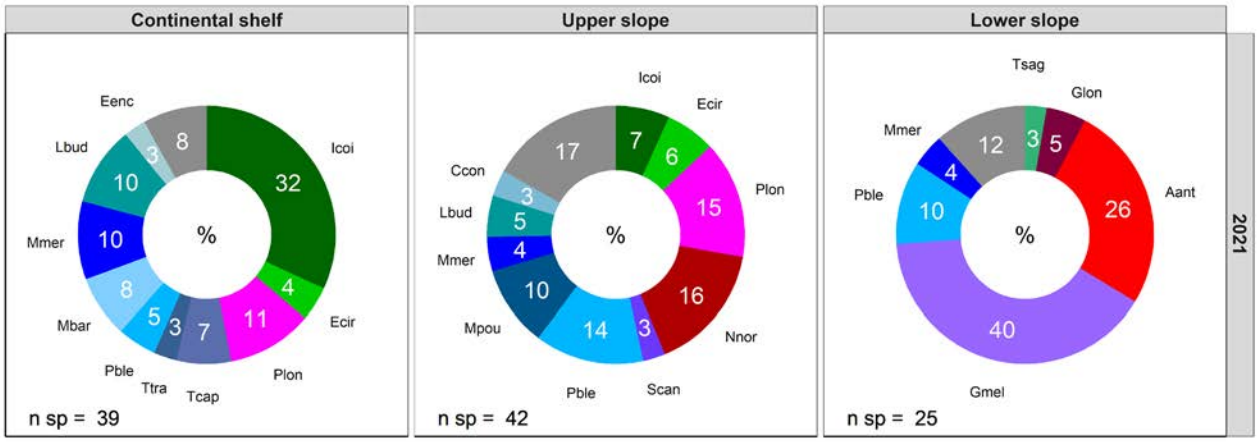


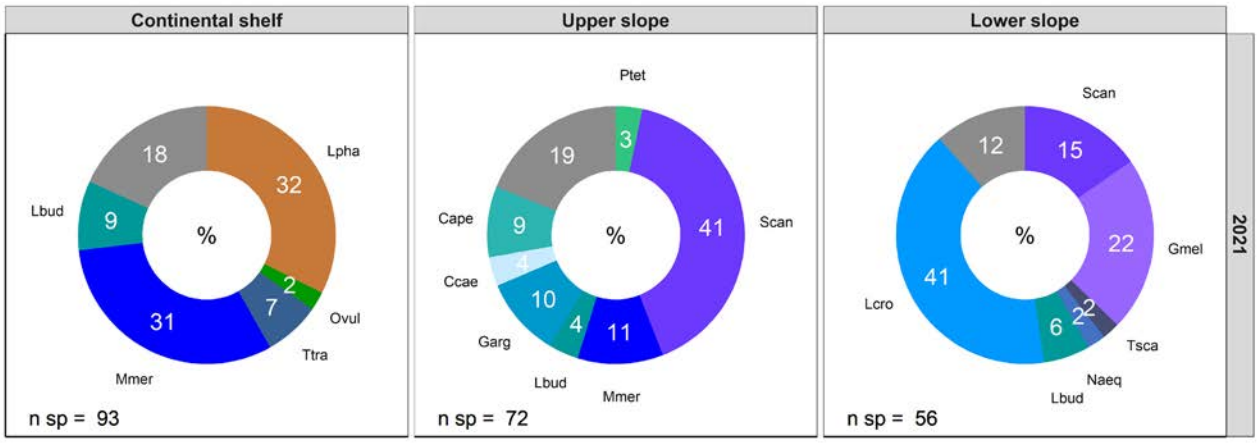
Figure 62. Tarragona catch composition. Percentage by weight of landings, discarded and debris fraction in each depth strata including all hauls in 2021.

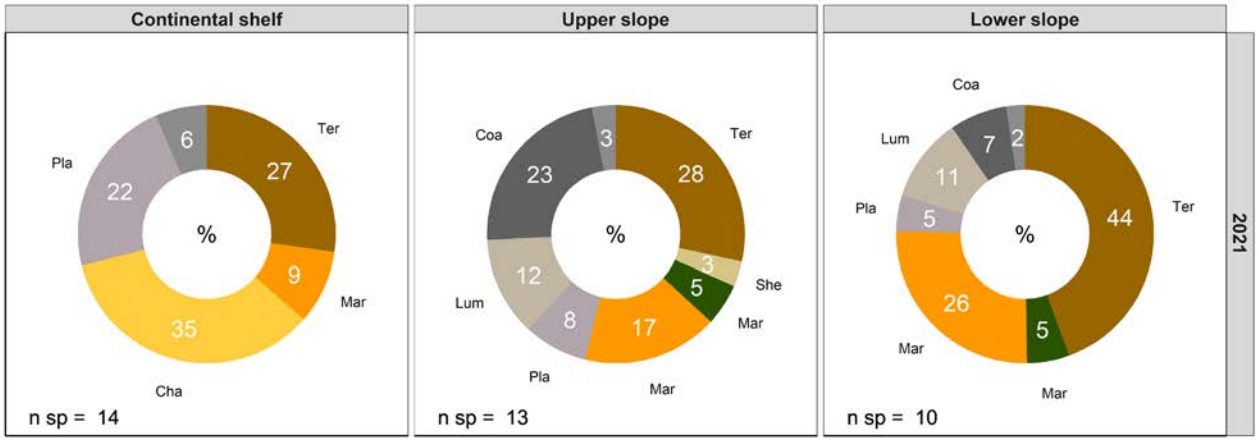
Figure 63. Tarragona species with most biomass landed in 2021 (next page, top).

Figure 64. Tarragona species with most biomass discarded in 2021 (next page, center).

Figure 65. Tarragona cathegories with higher mass debris in 2021 (next page, bottom).


Continental shelf
Upper slope
Lower slope
2021
Eenc
Lbud
Icoi
Mmer
Mbar
Pble
Ttra
Tcap
Ecir
Plon
Ccon
Mpou
Scan
Nnor
Tsag
Glon
Aant
Gmel
%
n sp = 39
n sp = 42
n sp = 25
Others
Lophius budegassa (Lbud)
Merluccius merluccius (Mmer)
Mullus barbatus (Mbar)
Trisopterus capelanus (Tcap)
Physis blennoides (Pble)
Trachurus trachurus (Ttra)
Engraulis encrasicolus (Eenc)
Micromesistius poutassou (Mpou)
Conger conger (Ccon)
Scyliorhinus canicula (Scan)
Galeus melastomus (Gmel)
Parapenaeus longirostris (Plon)
Nephrops norvegicus (Nnor)
Aristeus antennatus (Aant)
Geryon longipes (Glon)
Illex coindetii (Icoi)
Eledone cirrhosa (Ecir)
Todarodes sagittatus (Tsag)


Continental shelf
Upper slope
Lower slope
2021
Lpha
Lbud
Ovul
Ttra
Mmer
Ptet
Cape
Ccae
Garg
Scan
Lcro
Gmel
Tsca
Naeq
%
n sp = 93
n sp = 72
n sp = 56
Others
Merluccius merluccius (Mmer)
Lophius budegassa (Lbud)
Trachurus trachurus (Ttra)
Gadiculus argenteus (Garg)
Capros aper (Cape)
Coelorinchus caelorhincus (Ccae)
Lampanyctus crocodilus (Lcro)
Nezumia aequalis (Naeq)
Trachyrincus scabrus (Tsca)
Scyliorhinus canicula (Scan)
Galeus melastomus (Gmel)
Octopus vulgaris (Ovul)
Pteroctopus tetracirrhus (Ptet)
Leptometra phalangium (Lpha)


Continental shelf
Upper slope
Lower slope
2021
Pla
Ter
Mar
Cha
Coa
She
Lum
%
n sp = 14
n sp = 13
n sp = 10
Plastic (Pla)
Coal (Coa)
Lumber (Lum)
Chalk debris (Cha)
Terrestrial plants (Ter)
Marine organic debris (Mar)
Marine plants (Mar)
Shells (She)
Others

L'Ametlla de Mar

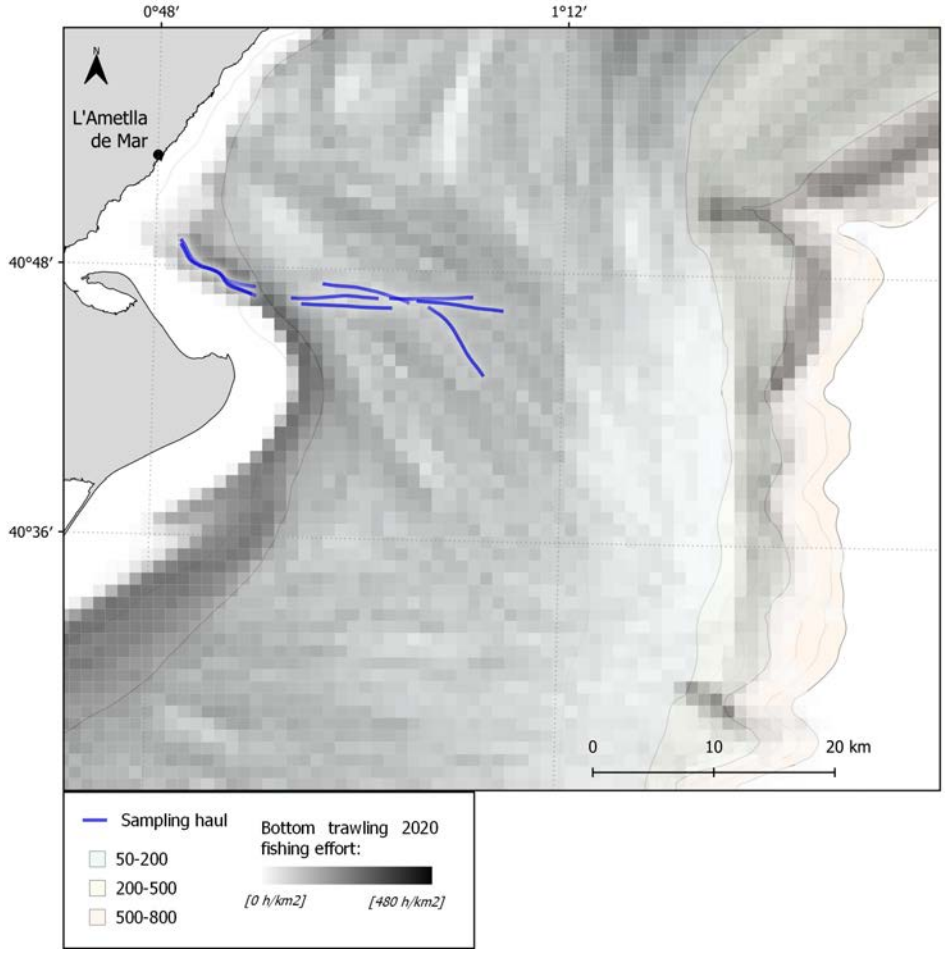


Figure 66. L'Ametlla de Mar sampling trawls in 2021.

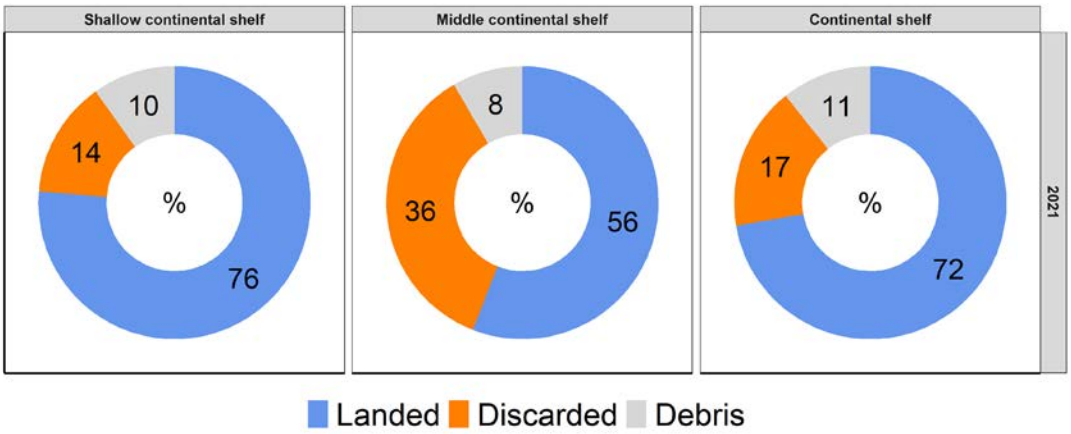
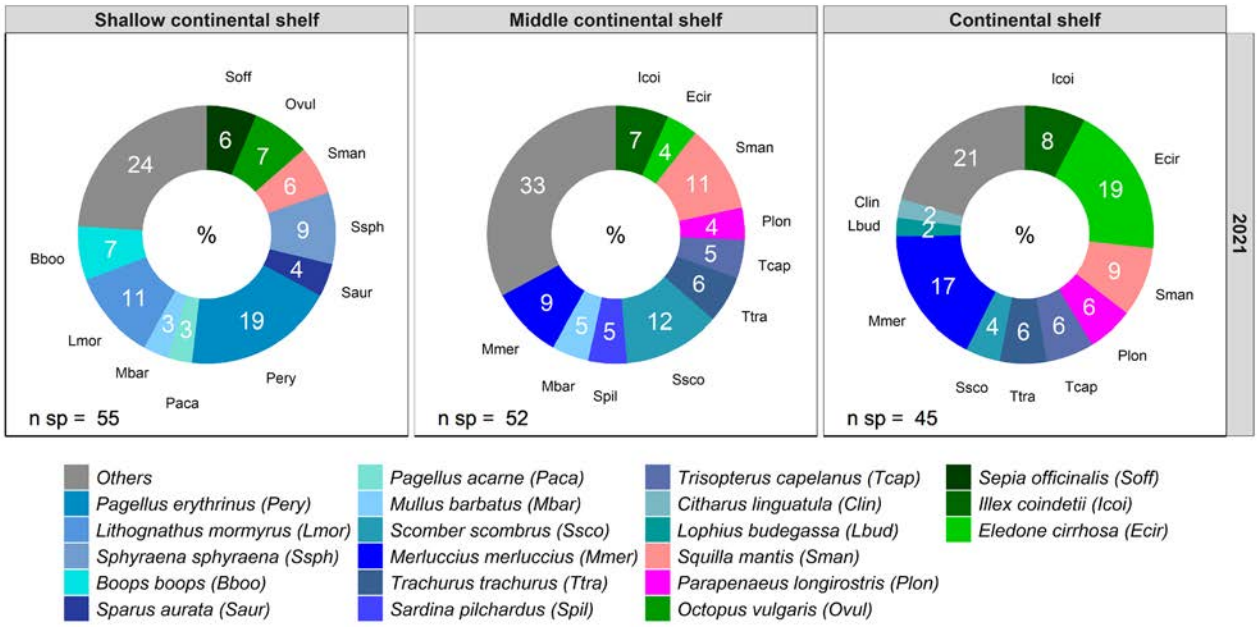


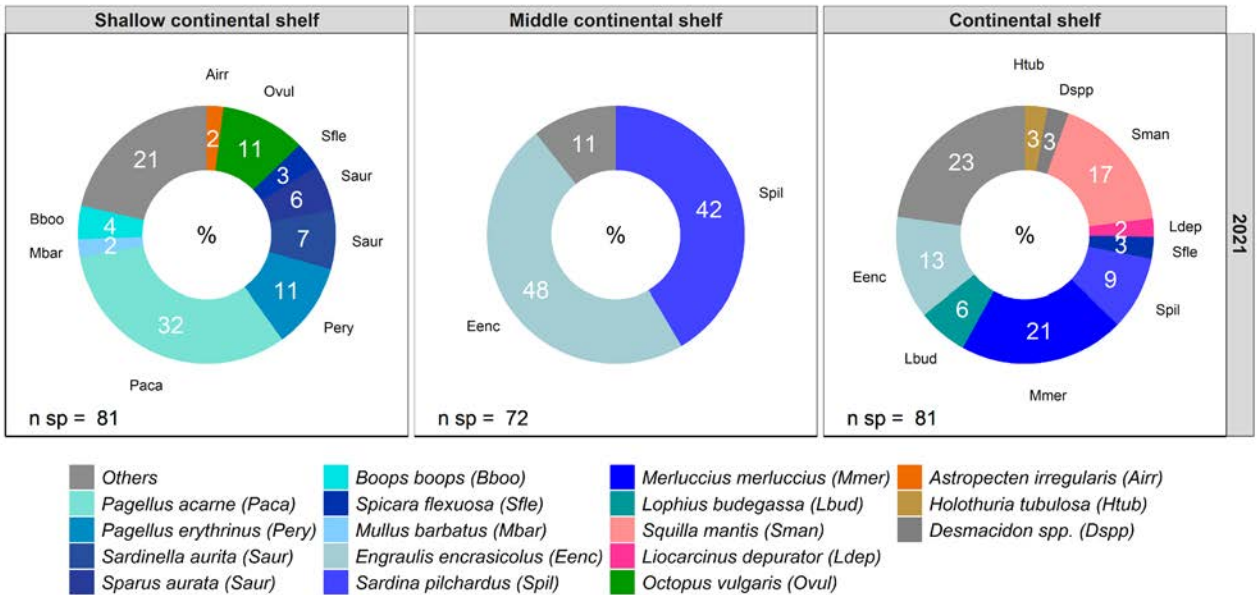
Figure 67. L'Ametlla de Mar catch composition. Percentage by weight of landings, discarded and debris fraction in each depth strata including all hauls in 2021.

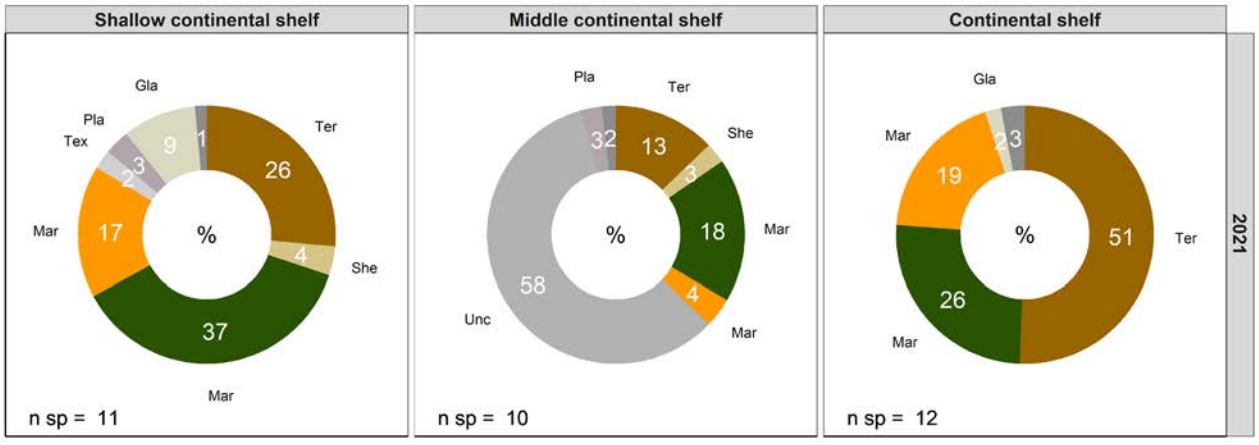
Figure 68. L'Ametlla de Mar species with most biomass landed in 2021 (next page, top).

Figure 69. L'Ametlla de Mar species with most biomass discarded in 2021 (next page, center).

Figure 70. L'Ametlla de Mar cathegories with higher mass debris in 2021 (next page, bottom).


Shallow continental shelf
Middle continental shelf
Continental shelf
2021
Soff
Ovul
Sman
Ssph
Saur
Pery
Paca
Mbar
Lmor
Bboo
n sp = 55
Icoi
Ecir
Sman
Plon
Tcap
Ttra
Ssco
Spil
Mbar
Mmer
n sp = 52
Icoi
Ecir
Sman
Plon
Tcap
Ttra
Ssco
Mmer
Lbud
Clin
n sp = 45
Others
Pagellus erythrinus (Pery)
Lithognathus mormyrus (Lmor)
Sphyraena sphyraena (Ssph)
Boops boops (Bboo)
Sparus aurata (Saur)
Pagellus acarne (Paca)
Mullus barbatus (Mbar)
Scomber scombrus (Ssco)
Merluccius merluccius (Mmer)
Trachurus trachurus (Ttra)
Sardina pilchardus (Spil)
Trisopterus capelanus (Tcap)
Citharus linguatula (Clin)
Lophius budegassa (Lbud)
Squilla mantis (Sman)
Parapenaeus longirostris (Plon)
Octopus vulgaris (Ovul)
Sepia officinalis (Soff)
Illex coindetii (Icoi)
Eledone cirrhosa (Ecir)


Shallow continental shelf
Middle continental shelf
Continental shelf
2021
Airr
Ovul
Sfle
Saur
Saur
Pery
Paca
Mbar
Bboo
n sp = 81
Spil
Eenc
n sp = 72
Htub
Dspp
Sman
Ldep
Sfle
Spil
Mmer
Lbud
Eenc
n sp = 81
Others
Pagellus acarne (Paca)
Pagellus erythrinus (Pery)
Sardinella aurita (Saur)
Sparus aurata (Saur)
Boops boops (Bboo)
Spicara flexuosa (Sfle)
Mullus barbatus (Mbar)
Engraulis encrasicolus (Eenc)
Sardina pilchardus (Spil)
Merluccius merluccius (Mmer)
Lophius budegassa (Lbud)
Squilla mantis (Sman)
Liocarcinus depurator (Ldep)
Octopus vulgaris (Ovul)
Astropecten irregularis (Airr)
Holothuria tubulosa (Htub)
Desmacidon spp. (Dspp)


Shallow continental shelf
Middle continental shelf
Continental shelf
2021
Gla
Pla
Tex
Ter
She
Mar
Mar
n sp = 11
Pla
Ter
She
Mar
Mar
Unc
n sp = 10
Gla
Mar
Ter
Mar
n sp = 12
Glass (Gla)
Plastic (Pla)
Textiles (Tex)
Unclassified debris (Unc)
Marine plants (Mar)
Terrestrial plants (Ter)
Marine organic debris (Mar)
Shells (She)
Others

La Ràpita

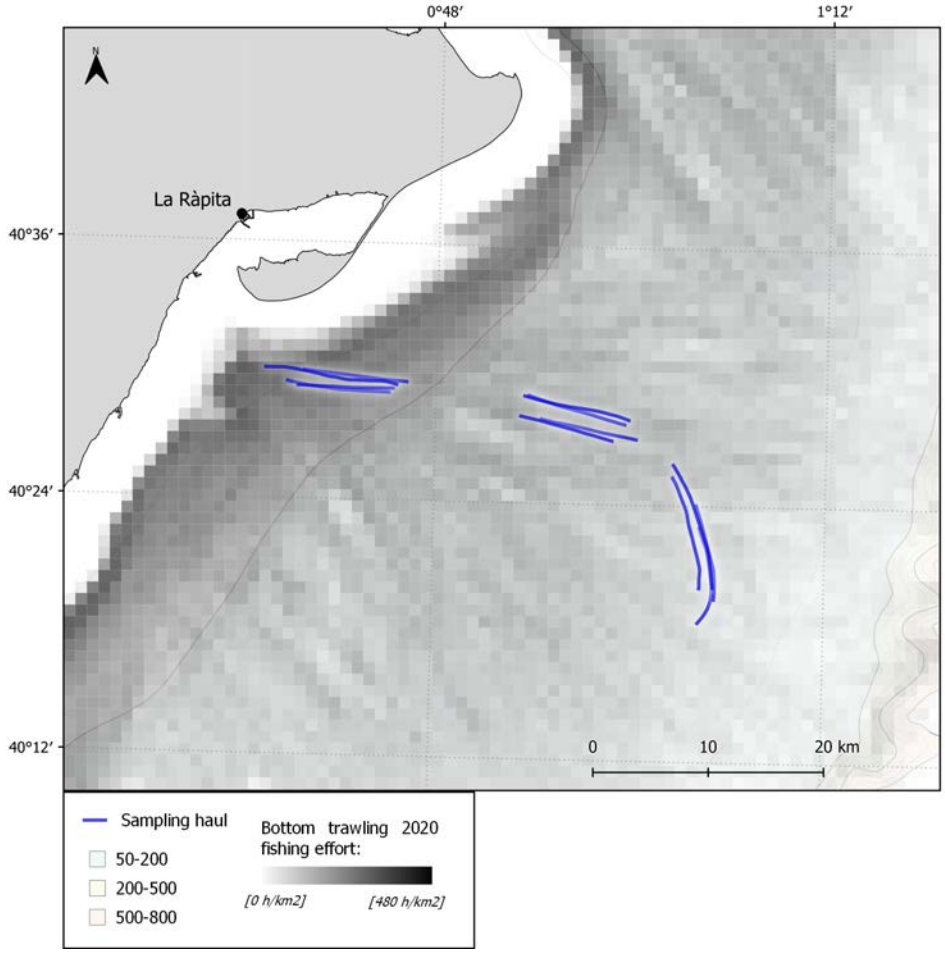


Figure 71. La Ràpita sampling trawls in 2021.

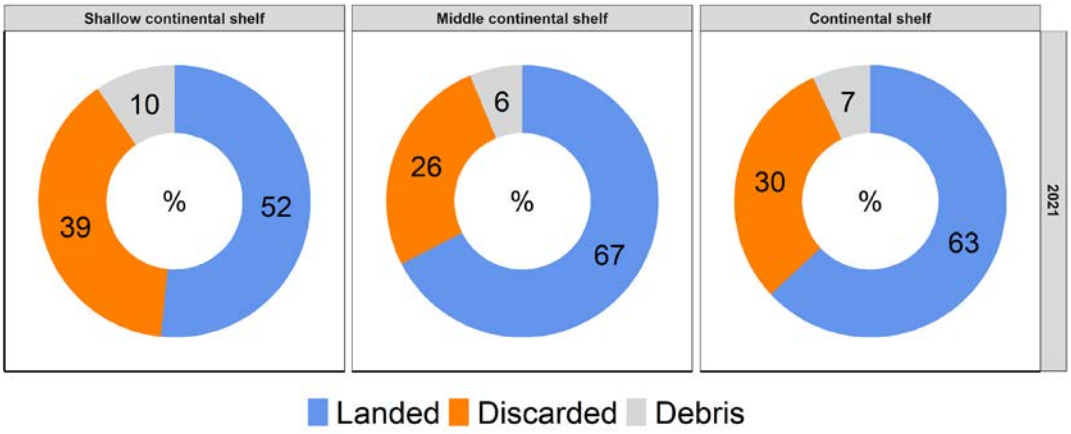
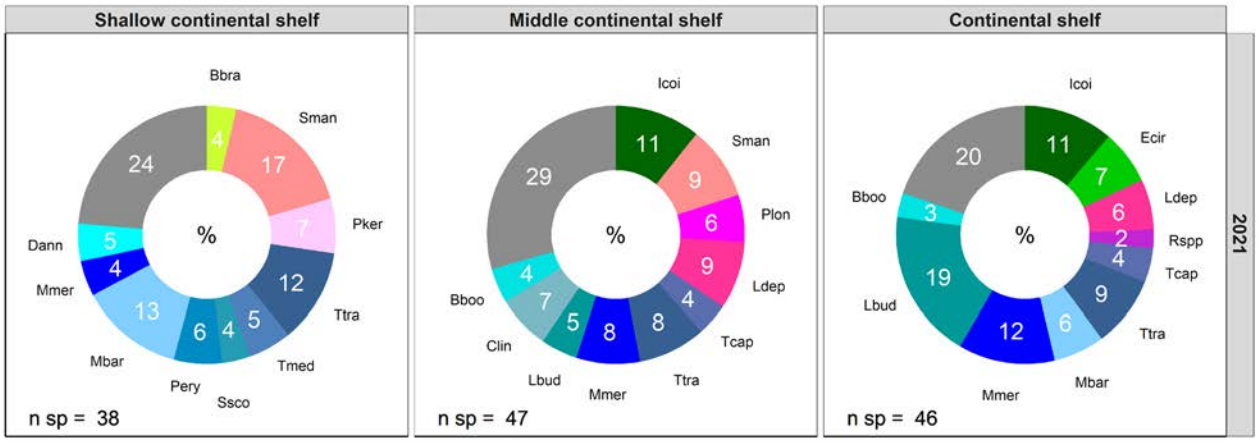


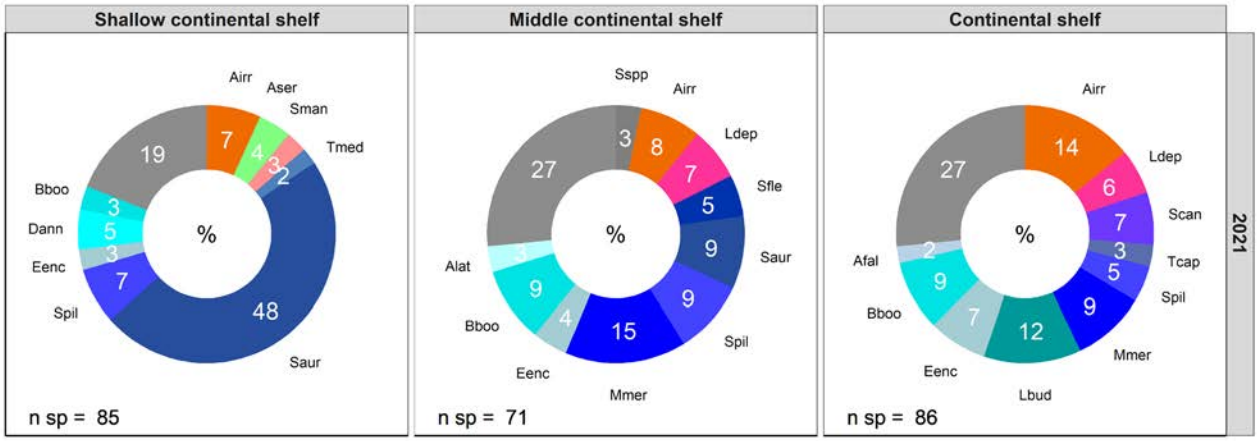
Figure 72. La Ràpita catch composition. Percentage by weight of landings, discarded and debris fraction in each depth strata including all hauls in 2021.

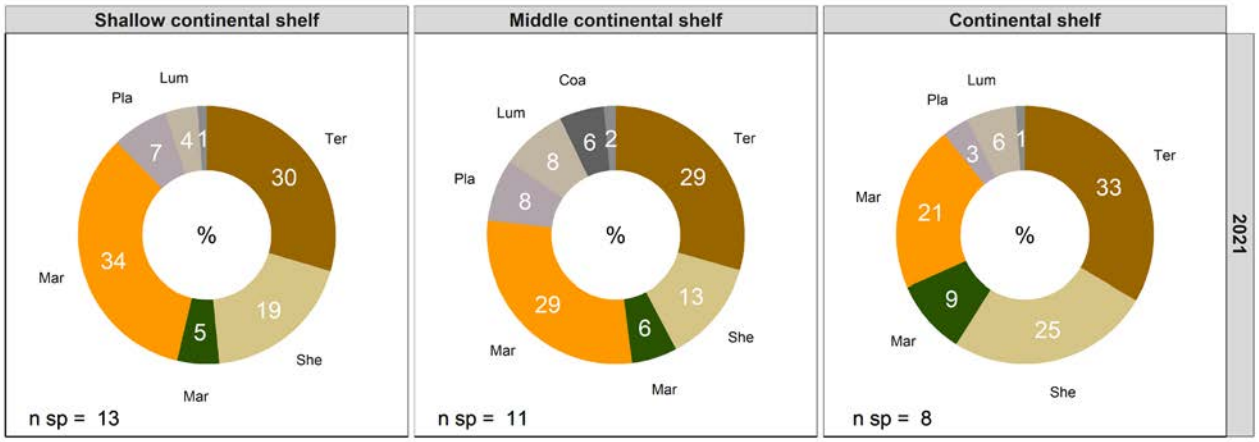
Figure 73. La Ràpita species with most biomass landed in 2021 (next page, top).

Figure 74. La Ràpita species with most biomass discarded in 2021 (next page, center).

Figure 75. La Ràpita cathegories with higher mass debris in 2021 (next page, bottom).


Shallow continental shelf
Middle continental shelf
Continental shelf
2021
Bbra
Sman
Pker
Ttra
Tmed
Ssco
Pery
Mbar
Mmer
Dann
Icoi
Plon
Ldep
Tcap
Ttra
Lbud
Clin
Bboo
Ecir
Rspp
Mbar
n sp = 38
n sp = 47
n sp = 46
Others
Mullus barbatus (Mbar)
Trachurus trachurus (Ttra)
Pagellus erythrinus (Pery)
Trachurus mediterraneus (Tmed)
Diplodus annularis (Dann)
Merluccius merluccius (Mmer)
Scomber scombrus (Ssco)
Citharus linguatula (Clin)
Lophius budegassa (Lbud)
Boops boops (Bboo)
Trisopterus capelanus (Tcap)
Raja spp. (Rspp)
Squilla mantis (Sman)
Penaeus kerathurus (Pker)
Liocarcinus depurator (Ldep)
Parapenaeus longirostris (Plon)
Illex coindetii (Icoi)
Eledone cirrhosa (Ecir)
Bolinus brandaris (Bbra)


Shallow continental shelf
Middle continental shelf
Continental shelf
2021
Airr
Aser
Sman
Tmed
Saur
Spil
Eenc
Dann
Bboo
Sspp
Ldep
Sfle
Alat
Mmer
Scan
Tcap
Afal
Lbud
n sp = 85
n sp = 71
n sp = 86
Others
Sardinella aurita (Saur)
Sardina pilchardus (Spil)
Diplodus annularis (Dann)
Boops boops (Bboo)
Engraulis encrasicolus (Eenc)
Trachurus mediterraneus (Tmed)
Merluccius merluccius (Mmer)
Spicara flexuosa (Sfle)
Arnoglossus laterna (Alat)
Lophius budegassa (Lbud)
Trisopterus capelanus (Tcap)
Alosa fallax (Afal)
Scyliorhinus canicula (Scan)
Squilla mantis (Sman)
Liocarcinus depurator (Ldep)
Astropecten irregularis (Airr)
Aporrhais serresiana (Aser)
Salpa spp. (Sspp)


Shallow continental shelf
Middle continental shelf
Continental shelf
2021
Lum
Pla
Ter
Mar
She
Coa
n sp = 13
n sp = 11
n sp = 8
Plastic (Pla)
Lumber (Lum)
Coal (Coa)
Marine organic debris (Mar)
Terrestrial plants (Ter)
Shells (She)
Marine plants (Mar)
Others

Purse seine fishing

A total of 76 purse seine samplings were carried out in 2021 (Fig. 76)

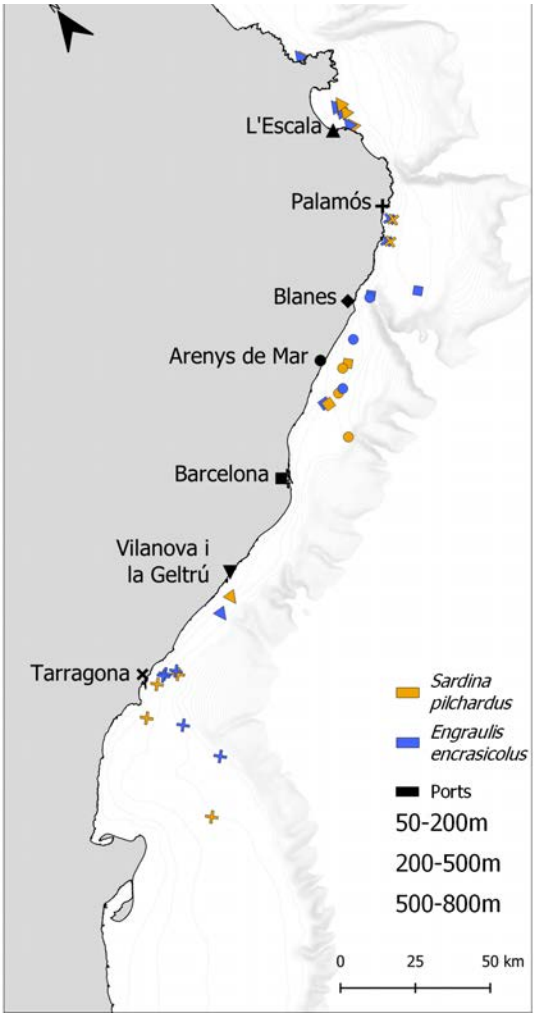


Figure 76. Purse seine fishing sampling conducted in Catalonia in 2021.

Purse seine fishing by species

European sardine (*Sardina pilchardus*) PIL

The total European sardine catch in Catalonia in 2021 was 3 654.99 t, over 92% of it caught by purse seine fishing (ICATMAR, 22-03).

The annual length-frequency distribution of European sardine shows a similar trend for all years (Fig. 78). The species size range extended from 7.5 to 18.5 cm with a mode located at 13.5 cm in 2019 and 13 cm in 2020 and 2021. It is worth noting that in 2021 there was a larger proportion of caught individuals below the size at first maturity, established at 10.5 cm (Albo-Puigserver et al., 2021), and the MCRS, located at 11 cm, representing immature and small-sized individuals that had not yet bred.

According to the length-weight relationship parameters for both sexes combined, the European sardine displayed a positive allometric growth (b > 3) (Table 8). Likewise, growth curves applied separately by sex showed that both sexes grew positive allometrically, exhibiting males higher b value

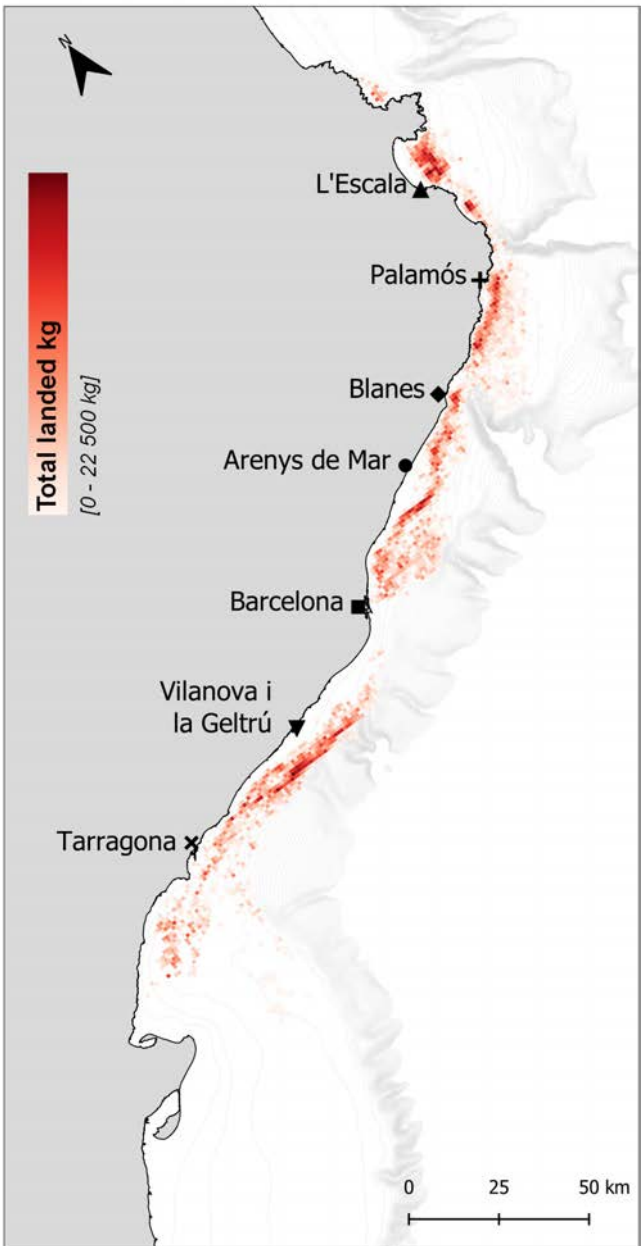


Figure 77. Spatial distribution of European sardine landings.

Table 8 European sardine length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.0053	3.1437	1	1 423
Females	0.0057	3.1135	1	728
Males	0.0048	3.1763	0.9	622

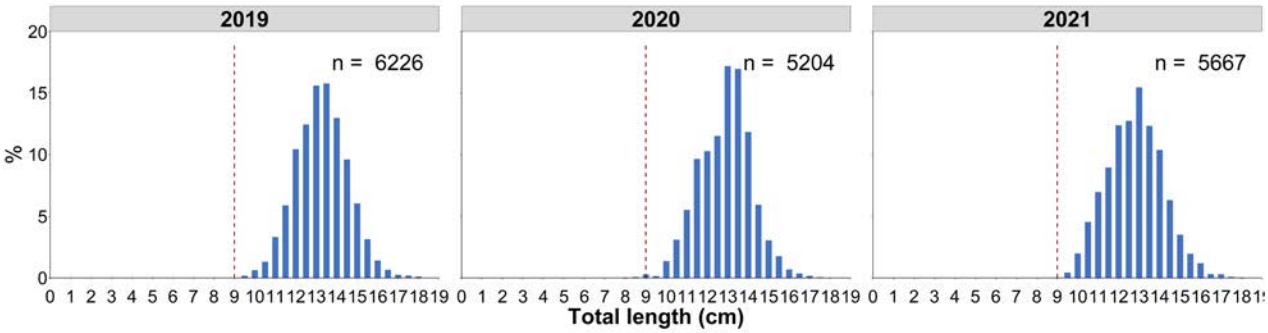


Figure 78. Annual length-frequency distribution of European sardine at different depth strata from 2019 to 2021 in Catalonia. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) is the number of measured individuals.

than females.

A total of 735 females and 665 males were biologically analyzed to study the gonadal cycle of the European sardine for 2021 (Fig. 79). The reproductive period was observed from October to April when males and females in active maturity states (stages II – V) were present. However, the reproductive peak seemed to appear from November to February, with a maximum in December for both sexes, when the highest proportion of spawners (stage IV) were detected. These results are in agreement with the gonadosomatic index (GSI), increasing in October, reaching maximum values from December to February (> 4 in females and > 3 in males), and declining in March. The highest proportion of individuals in resting state (stage VI) was observed from May to September, coinciding with the period when GSI exhibited the minimum values for both

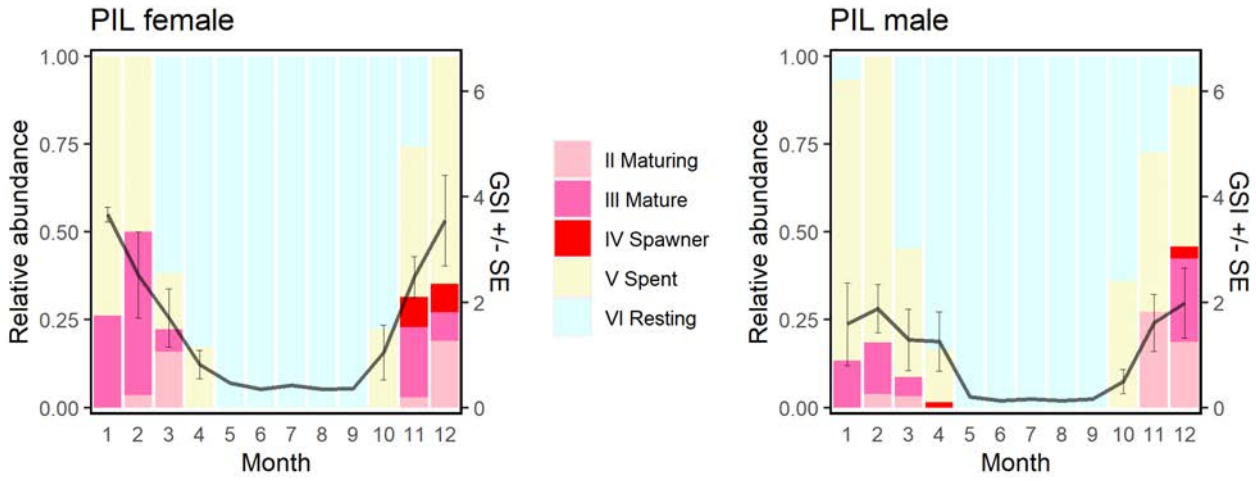


Figure 79. European sardine monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

sexes.

Anchovy (*Engraulis encrasicolus*) ANE

The total anchovy catch in Catalonia in 2021 was 5 559.54 t, over 94% of it caught by purse seine fishing (ICATMAR, 22-03)

The annual length-frequency distribution of anchovy shows a similar trend for 2019 and 2021, whereas a different pattern can be observed in 2020 (Fig. 81). In 2019 and 2021, more than 60% of the catch was composed of individuals between 11 and 12.5 cm with a mode located at 12 cm. In contrast, in 2020 the mode was located at 11 cm. It is worth noting that in 2020 there was a larger proportion of caught individuals below the size at first maturity, located at 9.6 cm ((Albo-Puigserver et al., 2021), and the MCRS, located at 9 cm, representing immature and small-sized individuals that had not yet bred.

According to the length-weight relationship parameters for both sexes combined, the European anchovy displayed a positive allometric growth (b > 3) (Table 9). Likewise, growth curves applied separately by sex showed that both sexes grew positive allometrically, exhibiting males higher b value than females.

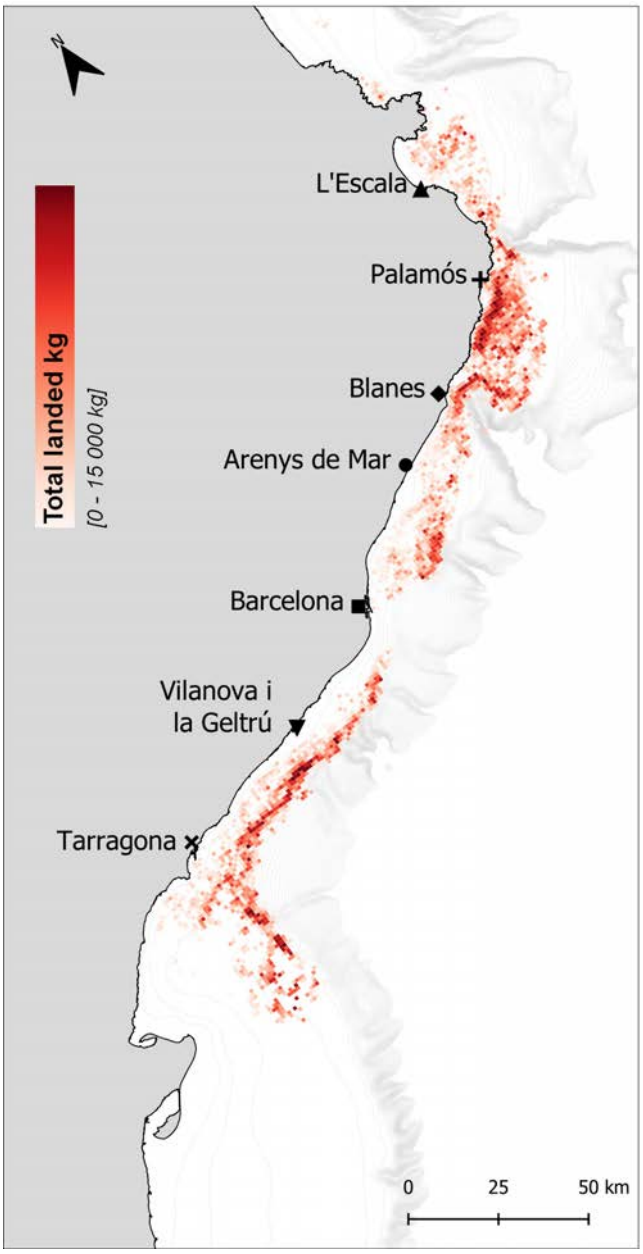


Figure 80. Spatial distribution of Anchovy landings.

Table 9 Anchovy length-weight relationship parameters in 2021.

2021	a	b	R2	n
Combined	0.0034	3.2474	1	1 490
Females	0.0035	3.2349	1	837
Males	0.0035	3.2424	1	582

A total of 779 females and 528 males were biologically analyzed to study the gonadal cycle of the anchovy for 2021 (Fig. 82). The reproductive period was observed from April to October when males and females in active maturity states (stages II – V) were present. However, the reproductive peak seemed to concentrate from May to July for both sexes, when the highest proportion of spawners was detected. These results are in agreement with the gonadosomatic index (GSI) throughout the year, increasing in April, reaching maximum values in June (> 4 for both sexes), and decreasing progressively at the end of summer until October. The highest proportion of individuals in resting state (stage VI) was observed from November to March, coinciding with the period when GSI exhibited the minimum values for both sexes.

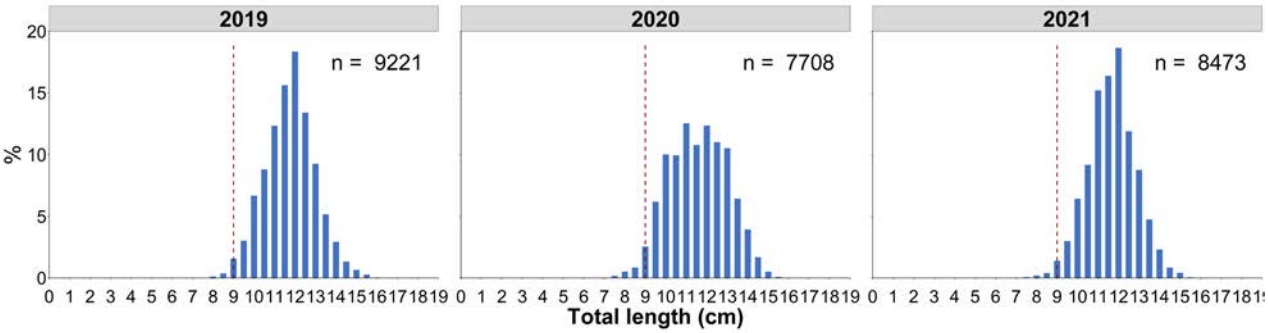


Figure 81. Annual length-frequency distribution of Anchovy at different depth strata from 2019 to 2021 in Catalonia. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) is the number of measured individuals.

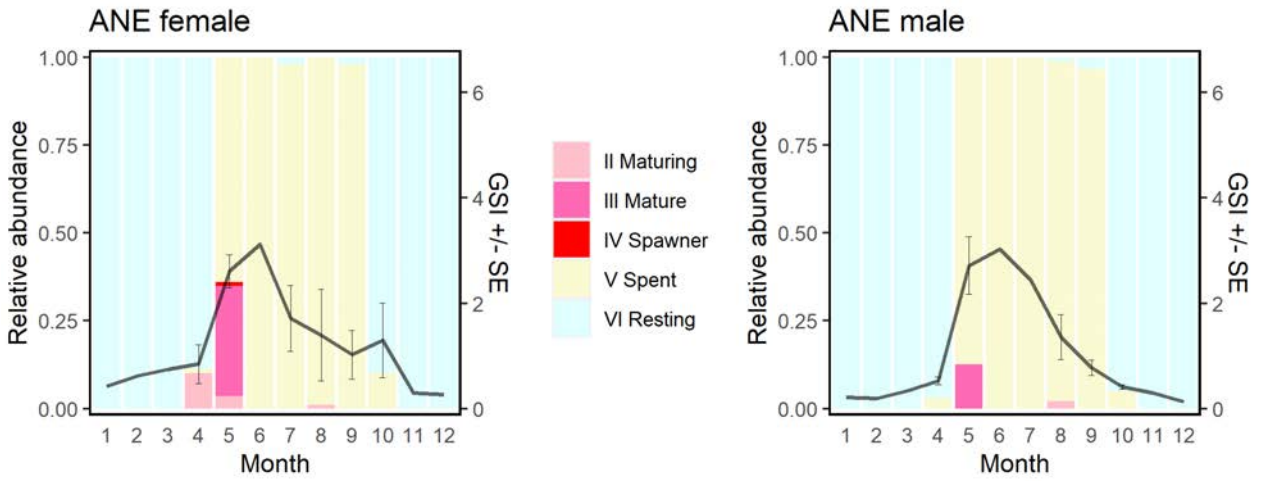


Figure 82. Anchovy monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Small-scale fisheries

Sand eel fishery

Sand eel fishery in Catalonia

In Catalonia, the main target species by the boat seines "*sonsera*" are *Gymnammodytes cicerelus* (Rafinesque, 1810), *Gymnammodytes semisquamatus* (Jourdain, 1879), and *Aphia minuta* (Risso, 1810). The two species of the genus *Gymnammodytes* are coastal species found on the continental shelf on shallow waters, on sand, shells and fine gravel bottoms, inhabiting burrows dug on sandy substrates and living in large groups.

The sand eel fishery is regulated by quotas and fishing effort limitations (number of vessels and fishing days per vessel). Fishing has a regulated closure during the spawning season, from December 15th to March 1st. However, the transparent goby is only allowed to be fished during the closed fishing period for the sand eels.

The total sand eel catch in Catalonia in 2021 was 73.75 t, all of it caught by boat seines "*sonsera*" within the co-management plan (ICATMAR, 22-03). During 2021 the opening and closure dates of the sand eel fishery slightly changed compared to previous years. It was opened on March 29th and closed on October 25th, but at that time, catches were providing less than 50% of species daily quota and, in accordance with article 6.6 of order ACC/155/2021, the fishery had to be closed. This implies that in October 2021 only one sampling was carried out, in Novem-

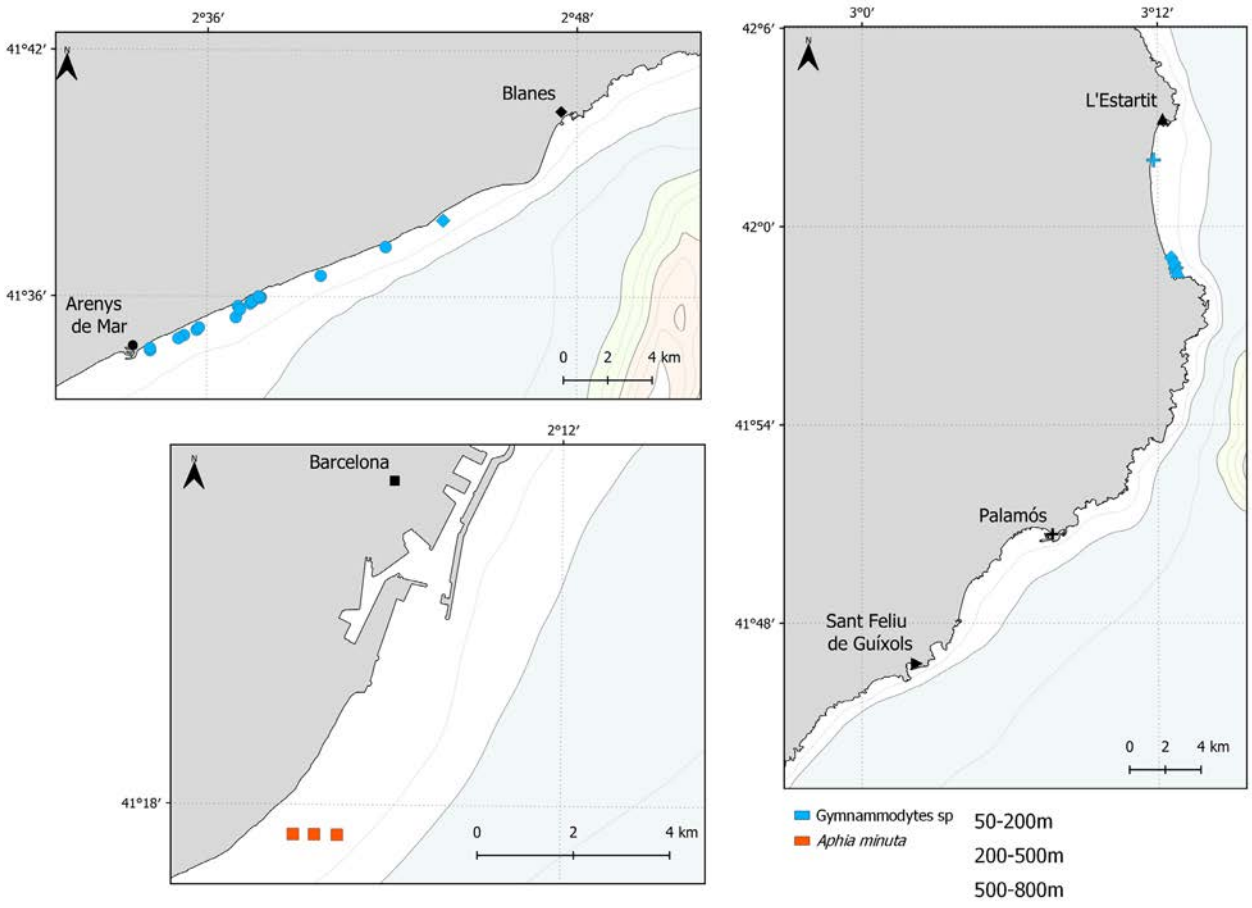


Figure 83. Sand eel samplings in 2021.

ber none and in December one sampling was done (during closure periods, one sampling per month is carried out to check the trend of the population before opening the fishery). A total of 27 samplings were carried out in 2021(Fig. 83).

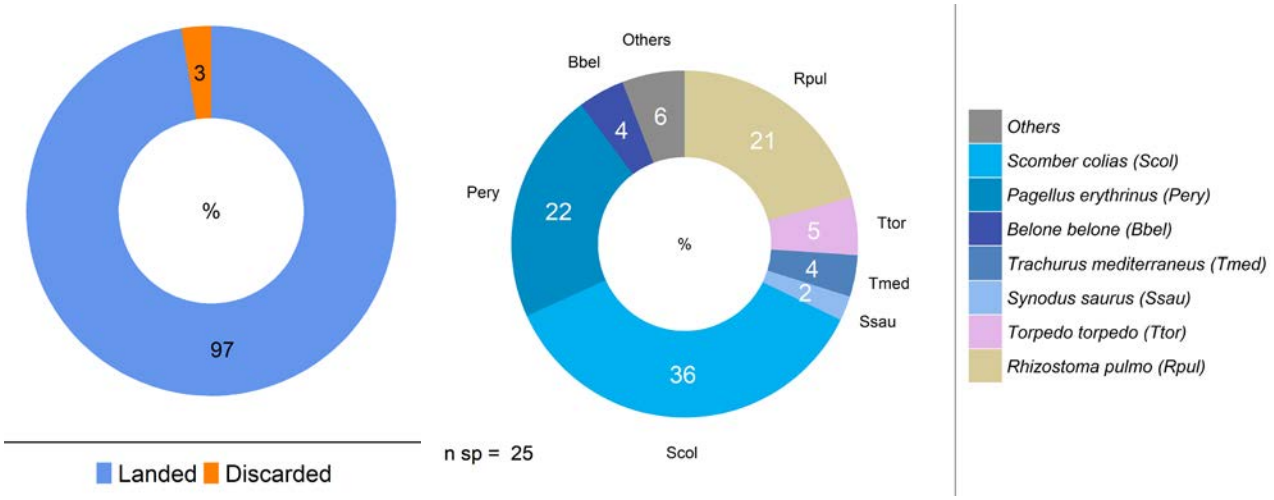


Figure 84. Sand eel fishery catch composition (left), species with most biomass discarded (right).

The 97% of catch were sand eel and 3% were discards composed by 25 different species (Fig. 84 left). The species more abundant in biomass on discards of sand eel was *Pagellus erythrinus* (Fig. 84 right).

Sand eel fishery by species

Mediterranean sand eel (*Gymnammodytes cicerelus*) ZGC

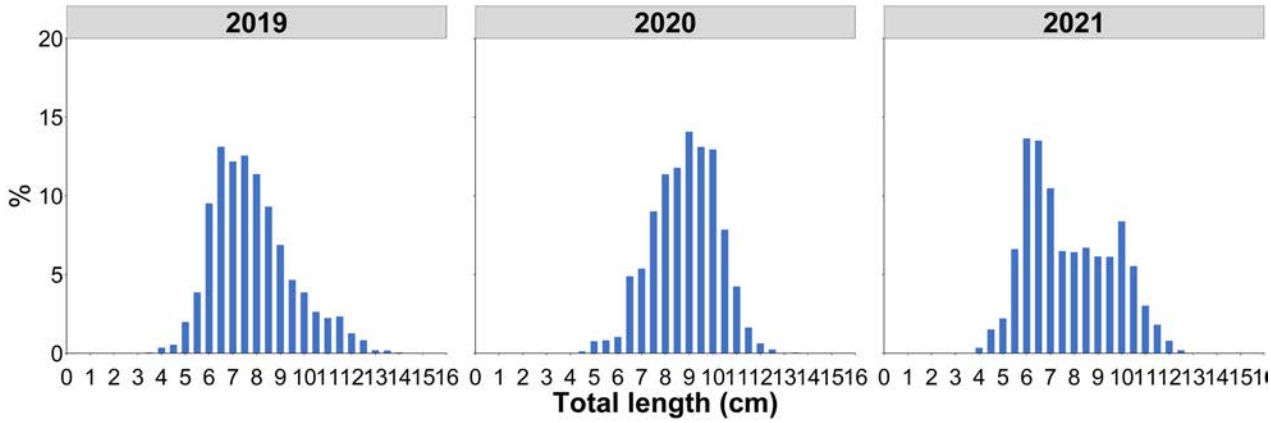


Figure 85. Annual length-frequency distribution of mediterranean sand eel (*G. cicerelus*) 2019 to 2021 in Catalonia.

The annual distribution of *G. cicerelus* length-frquencies ranged from 4 to 14 cm (Fig. 85). Size frequencies varies between the three years sampled. In 2019, 15% of individuals were small (from 6 to 8 cm). In contrast, in 2020 most of individuals achive 9 cm. In 2021 bimodal distribution was observed with high percentage of individuals of 6 and 10 cm, although with high percentage of small individuals (Fig. 85).

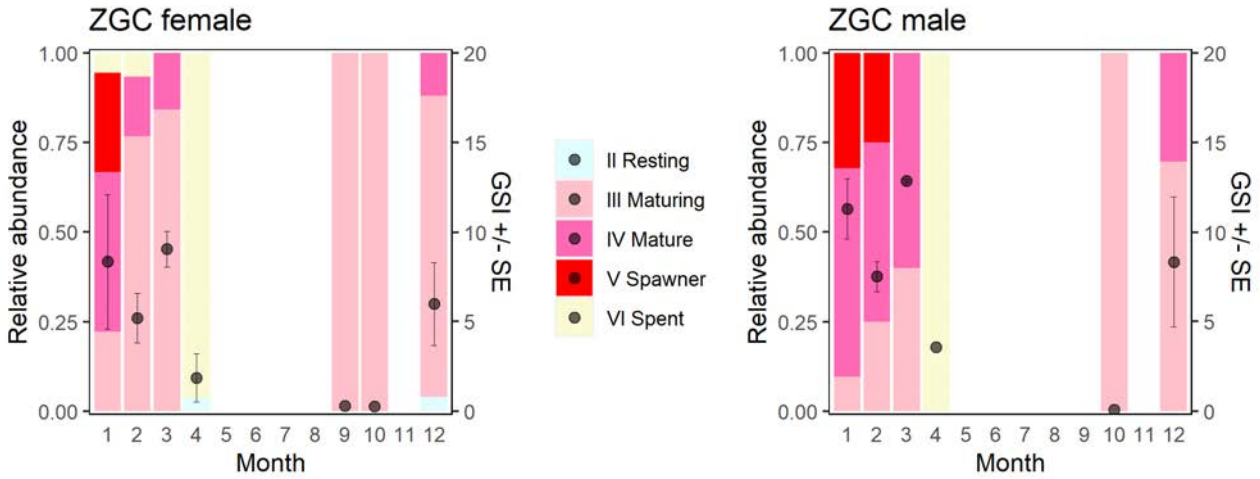


Figure 86. Mediterranean sand eel monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Table 10. Mediterranean sand eel length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.0016	3.2229	1	977
Females	0.0025	3.0123	0.9	125
Males	0.0027	2.9635	0.9	111

The monthly distribution of the macroscopic classification of the maturity phases for *G. cicerelus* (Fig. 86) revealed the maximum occurrence of mature females (Phase IV) from December to March. The presence of spawning females (Phase V) was observed in January. Mature males showed a similar pattern as females, but the maximum peak of individuals in Phase V was found in April.

A total of 231 *G. cicerelus* (121 females and 110 males) were biologically analyzed to study their gonadal cycle during the sampling period (Fig. 86). The highest mean GSI, for both females and males, was found from December to March, with a peak of maximum activity in March. The months that are not represented in the graph were also sampled, but the individuals were small in size and their sex could not be determined.

The parameters of the length-weight relationship show a positive allelomeric growth for *G. cicerelus* (Table 10).

Smooth sand eel (*Gymnammodytes semisquamatus*) ZGS

Regarding the size frequency distribution of *G. semisquamatus* throughout the sampling period, the pattern is very similar to that of *Gymnammodytes cicerelus*. However, the number of specimens caught was much lower for *G. semisquamatus* (1 078) than for *G. cicerelus* (14 344).

The annual distribution of *G. semisquamatus* ranged from 3 to 13 cm (Fig. 87). Two modes can be found during 2019. Around 20% of the sampled individuals were 6 cm of total length, and the 10% were 11 cm long. In 2020, only one mode is recorded where 30% of the individuals sampled are 9 cm, while in 2021 the mode shifts to larger sizes, where 20% of the specimens are between 10 and 11 cm.

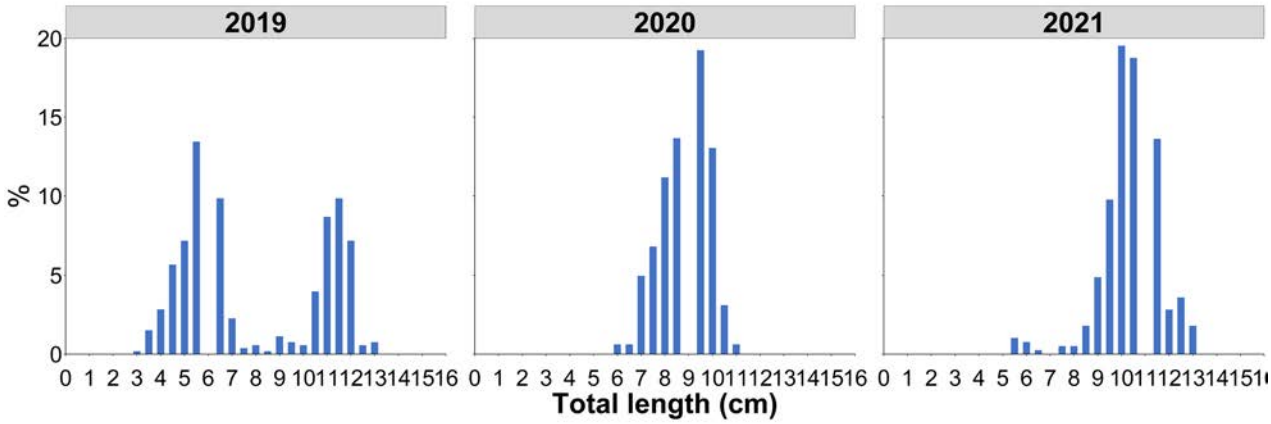


Figure 87. Annual length-frequency distribution of mediterranean sand eel (G. semisquamatus) from 2019 to 2021 in Catalonia.

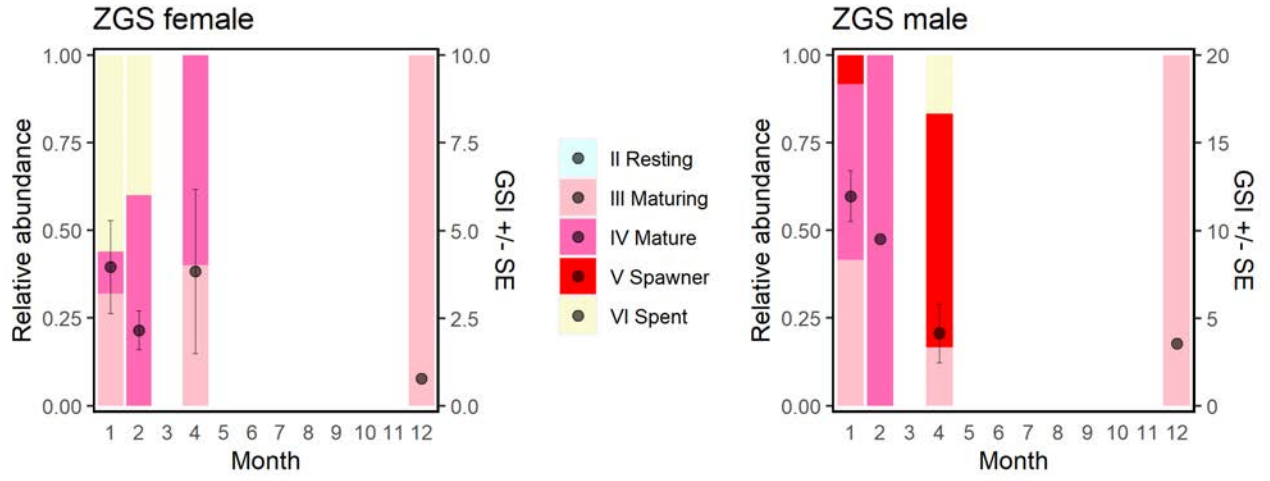


Figure 88. Smooth sand eel monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Table 11. Smooth sand eel length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.0024	2.9637	1	186
Females	0.0055	2.6159	0.9	68
Males	0.0037	2.7935	0.9	50

The length-weight relationship of *G. semisquamatus* shows a positive allelomeric growth for 2021 (Table 11).

A total of 116 *G. semisquamatus* individuals (67 females and 49males) were biologically analyzed to study their gonadal cycle for 2021 (Fig. 88).

Transparent goby (*Aphia minuta*) FIM

The annual distribution of Transparent goby ranged from 1.5 to 4.5 cm (Fig. 89). In 2019 most individuals were 4 cm of total length and in 2020 and 2021 3.5 cm long.

The monthly distribution of the macroscopic classification of the maturity phases for *A. minuta* (Fig. 90), revealed the maximum occurrence of maturing females (Phase III) in January and February. The months that are not represented in the graph were not sampled since the transparent goby is only allowed to be fished during the closed fishing period for the sand eel (December to March). Table 12 shows the size-weight relationship of *A. minuta*, where positive allelomeric growth can be observed in this species.

A total of 7 female *A. minuta* were biologically analyzed to study their gonadal cycle during the sampling period (Fig. 90).

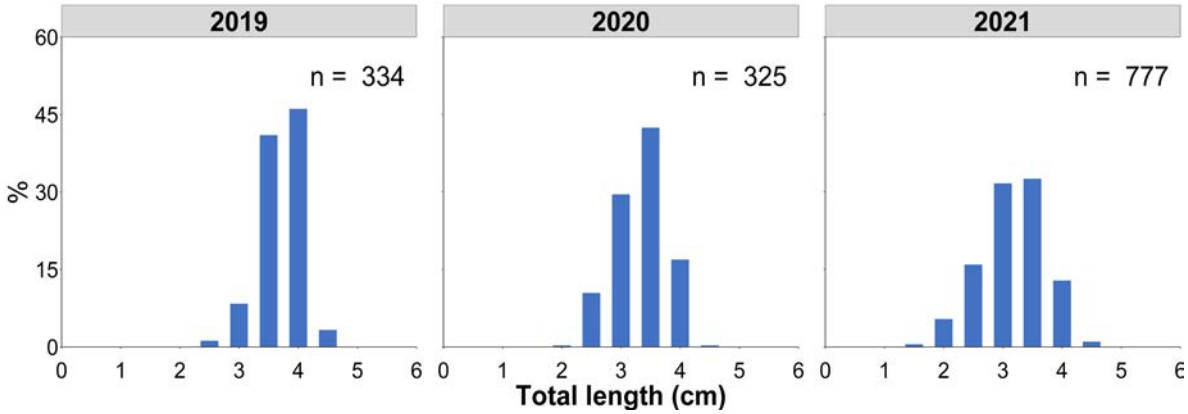


Figure 89. Annual length-frequency distribution of Transparent goby from 2019 to 2021 in Catalonia. (n) is the number of measured individuals.

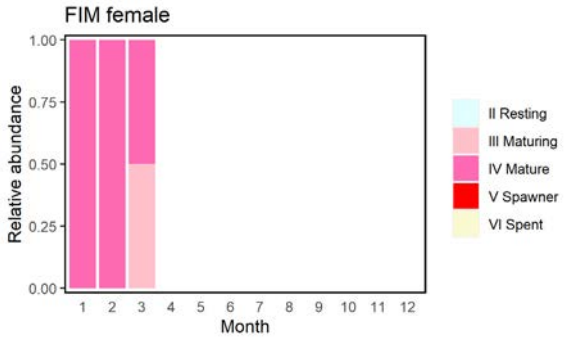


Figure 90. Transparent goby monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Table 12. Transparent goby length-weight relationship parameters in 2021.

2021	a	b	R^2	n
Combined	0.0025	3.3503	1	150

Common octopus fishery

Common octopus (*Octopus vulgaris*) OCC

A total of 57 samplings were carried out for the common octopus fishery in 2021 within the co-managed areas of Central Catalonia and the Ebre Delta (Fig. 91). Individuals below 1 kg weight were measured on board but not sold in auction, as explained by current regulation ARP/222/2020.

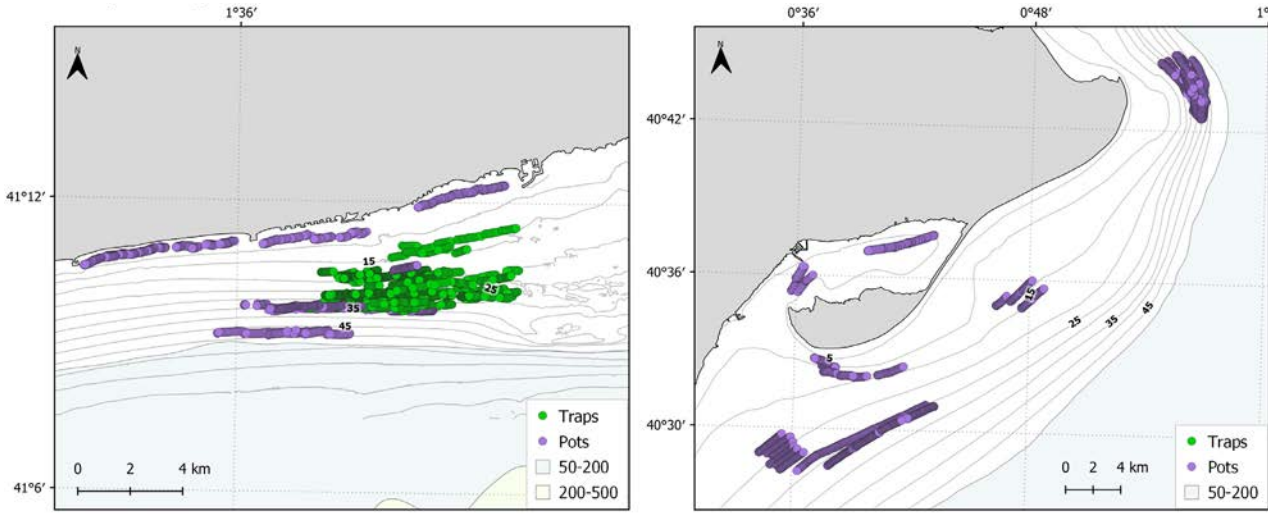


Figure 91. Common octopus sampling in 2021. Central Catalonia (left), Ebre delta (right).

The total common octopus catch in Catalonia in 2021 was 294.26 t, approximately 60% of which were caught by small-scale fisheries (the other 30% were caught by bottom trawling; ICATMAR, 22-03).

The annual weight-frequency distribution of common octopus by fishing gear indicates that most of the individuals caught were below the MCRW, established at 1 000 g (Fig. 92). As for the comparison between gears, traps showed a concentrated distribution around the mode (800 g), which is below the MCRW, and pots caught higher abundance of smaller individuals. Temporal distribution shows that, from 2019 to 2021, abundance values have increased and grown closer to the MCRW, which also shows a decrease of the largest individuals in the landings. Also, the shape of the weight-frequency distribution for pots went from bimodal to unimodal, stressing the change in the composition of the landings.

A total of 626 females and 649 males were biologically analyzed to study the gonadal cycle of the common octopus for 2021 (Fig. 93). Both sexes show a spawning period during late spring and summer, with the highest presence of mature and spawner specimens (stages IV and V respectively) from May to August (Fig. 93). However, sexual differences were observed.

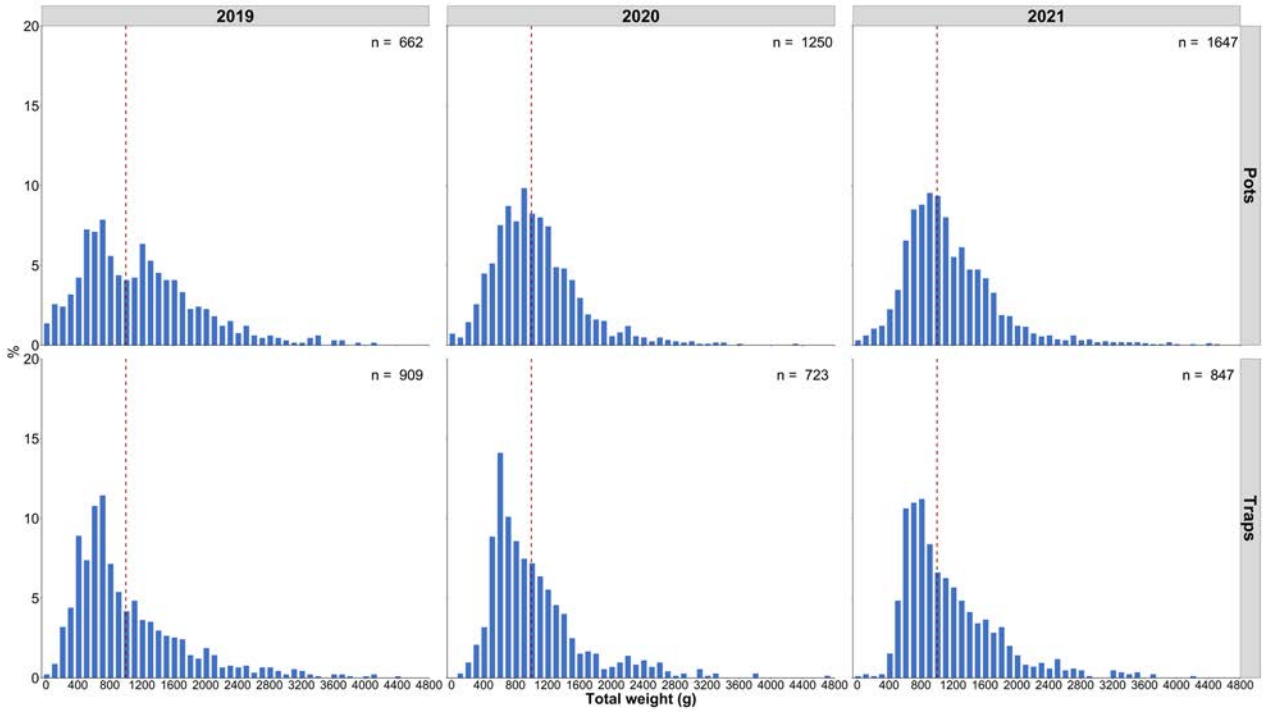


Figure 92. Annual weight-frequency distribution of Common octopus with different fishing gears (pots and traps) from 2019 to 2021 in Catalonia. Dashed red line indicates the MCRW (Minimum Conservation Reference Weight). (n) total number of mesured individuals.

The reproductive cycle of the females showed a marked seasonality, with the spawning period in late spring and summer. On the contrary, males showed a continuous reproductive cycle as advanced mature individuals occur all year-round. The lower presence of spawner females may be caused by a faster senescence process after spawning than in males which leads to an earlier death.

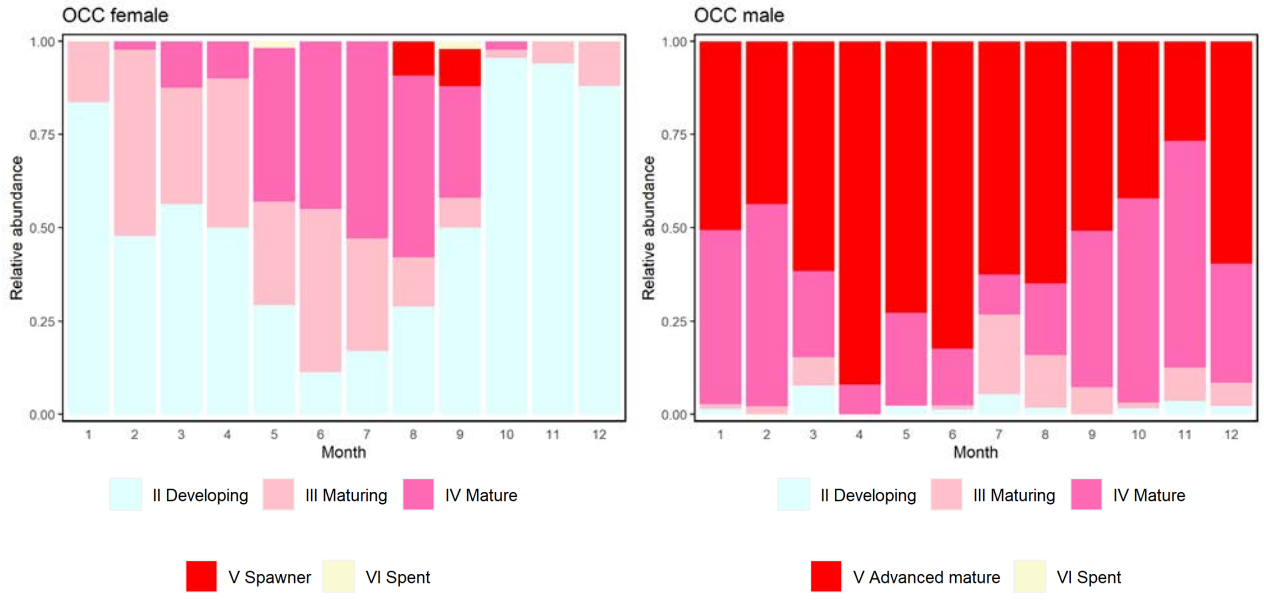


Figure 93. Common octopus monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Common octopus fishery in Central Catalonia

The annual weight-frequency distribution of common octopus in Central Catalonia showed similar values in terms of abundance between fishing gears, ranging from 20 g to 4 440 g (Fig. 94). As for the comparison between gears, pots showed a concentrated distribution around the MCRW, whereas traps' distribution was shifted towards higher weights. For both fishing gears, distributions showed the maximum abundance below the MCRW.

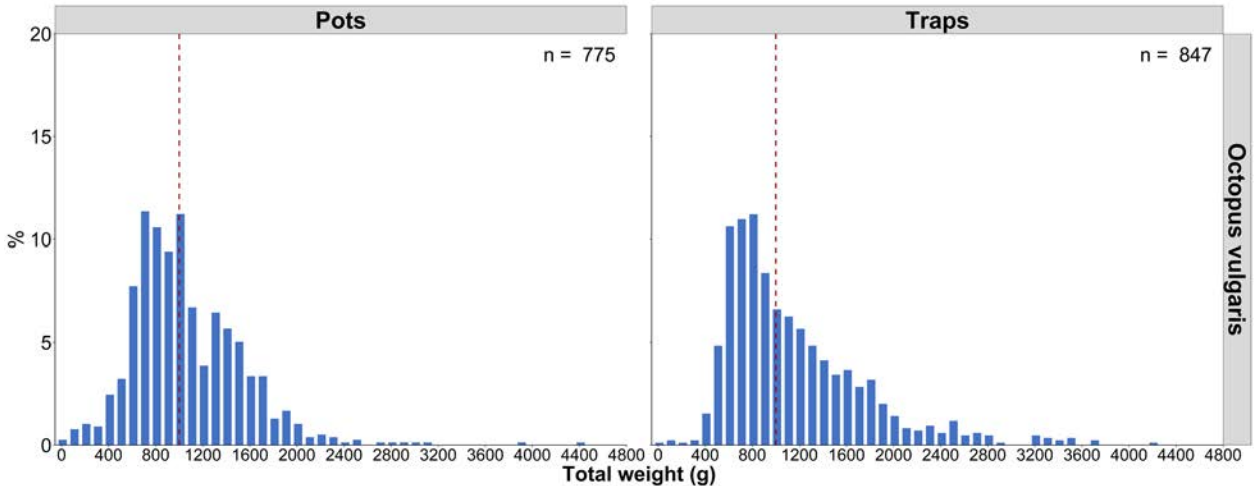


Figure 94. Annual weight-frequency distribution of Common octopus from 2019 to 2021 in center Catalonia. Dashed red line indicates the MCRW (Minimum Conservation Reference Weight). (n) total number of mesured individuals.

A total of 433 females and 480 males were biologically analyzed to study the gonadal cycle of the common octopus in Central Catalonia for 2021 (Fig. 95). Both sexes show a spawning period during late spring and summer, with the highest presence of mature and spawner specimens (stages IV and V respectively) from May to August. However, sexual differences were observed: females' reproductive cycle show a marked seasonality, with the spawning period in late spring and summer and, on the contrary, males showed a continuous reproductive cycle as advanced mature individuals occur all year-round.

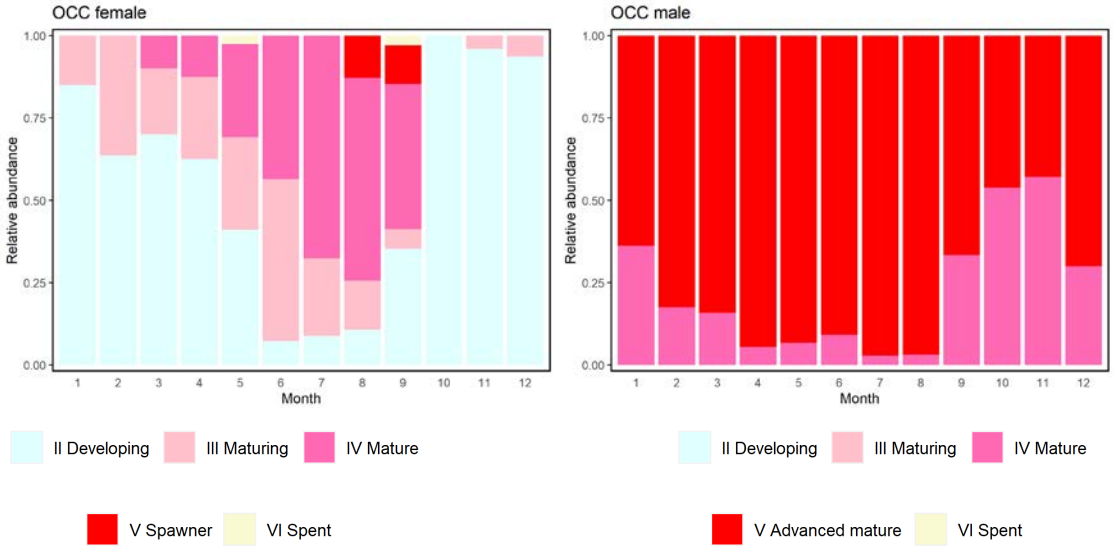


Figure 95. Common octopus monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

Common octopus fishery in the Ebre Delta

The annual weight-frequency distribution of common octopus in the Ebre delta was carried out considering only pot catches (Fig. 96). Individuals were in general larger than in the central region, reaching 4 600 g, although the shape of the distribution is similar in both areas.

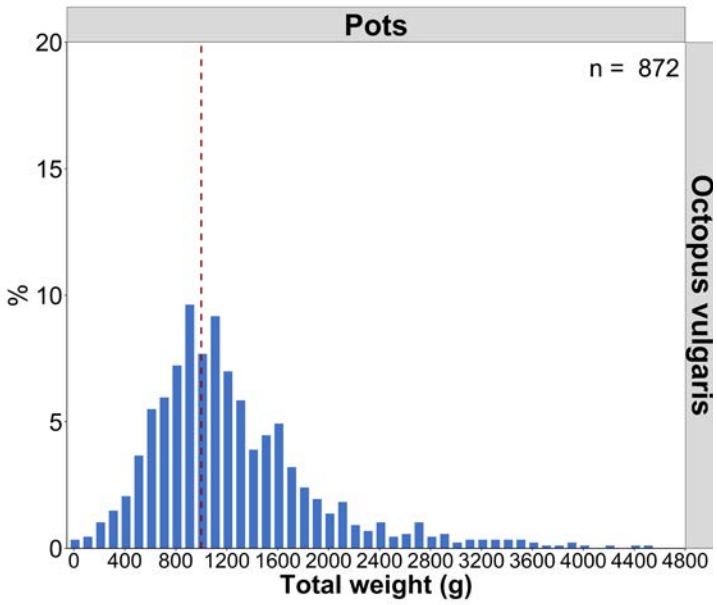


Figure 96. Annual weight-frequency distribution of Common octopus from 2019 to 2021 in Ebre Delta zone. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) total number of mesured individuals.

A total of 193 females and 169 males were biologically analyzed to study the gonadal cycle of the common octopus in the Ebre Delta for 2021 (Fig. 97). Both sexes showed a spawning period during late spring and summer as the highest presence of mature and spawner specimens (stages IV and V respectively) was from May to August. However, sexual differences were observed. Females' reproductive cycle showed a marked seasonality, with the spawning period in late spring and summer. On the contrary, males showed a continuous reproductive cycle as advanced mature individuals occur all year-round. The lower presence of spawner females may be caused by a faster senescence process after spawning than in males which leads to an earlier death.

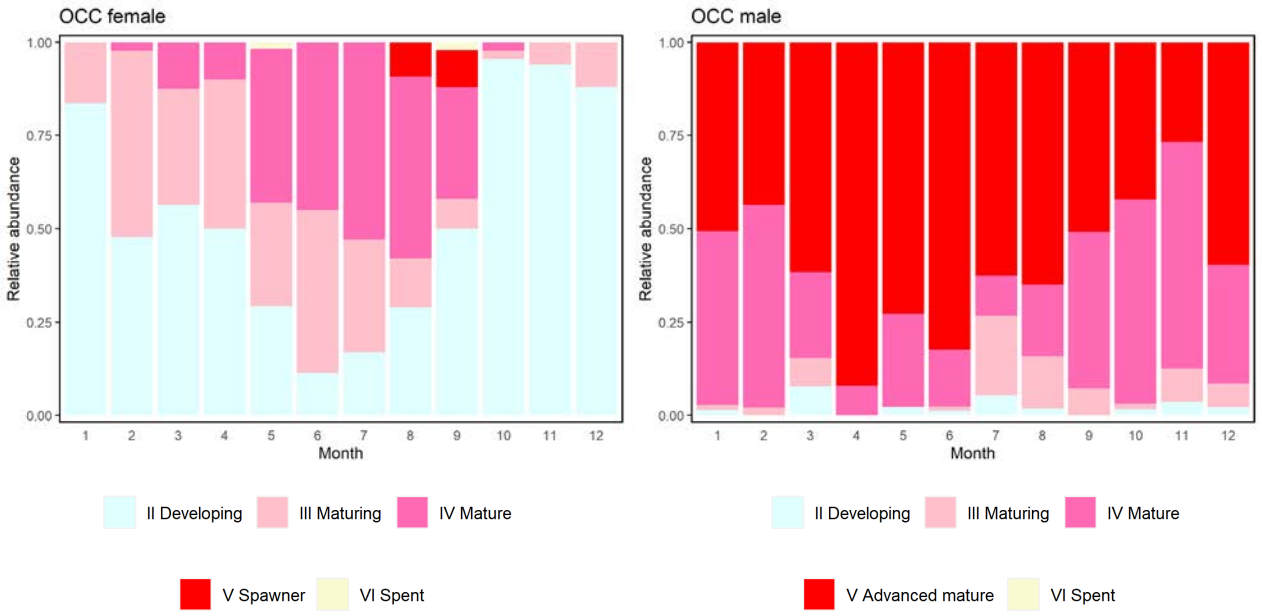


Figure 97. Common octopus monthly gonadal cycle for females and males. Gonadosomatic index (GSI +/-SD (Standard Deviation)) and percentage of different maturity stages.

SECTION 2

Information systems and data analysis

Introduction

The main purpose of ICATMAR of advising the administrations in fisheries management needs a strong data structure that allows its dynamic input and exploitation. A summary of the workflow is provided in Fig. 98, from data collection to the final products. The main technologies used and conceptualization of ICATMAR information systems have been described in previous reports (ICATMAR 2020). The present report only focuses on the latestupgrades implemented.

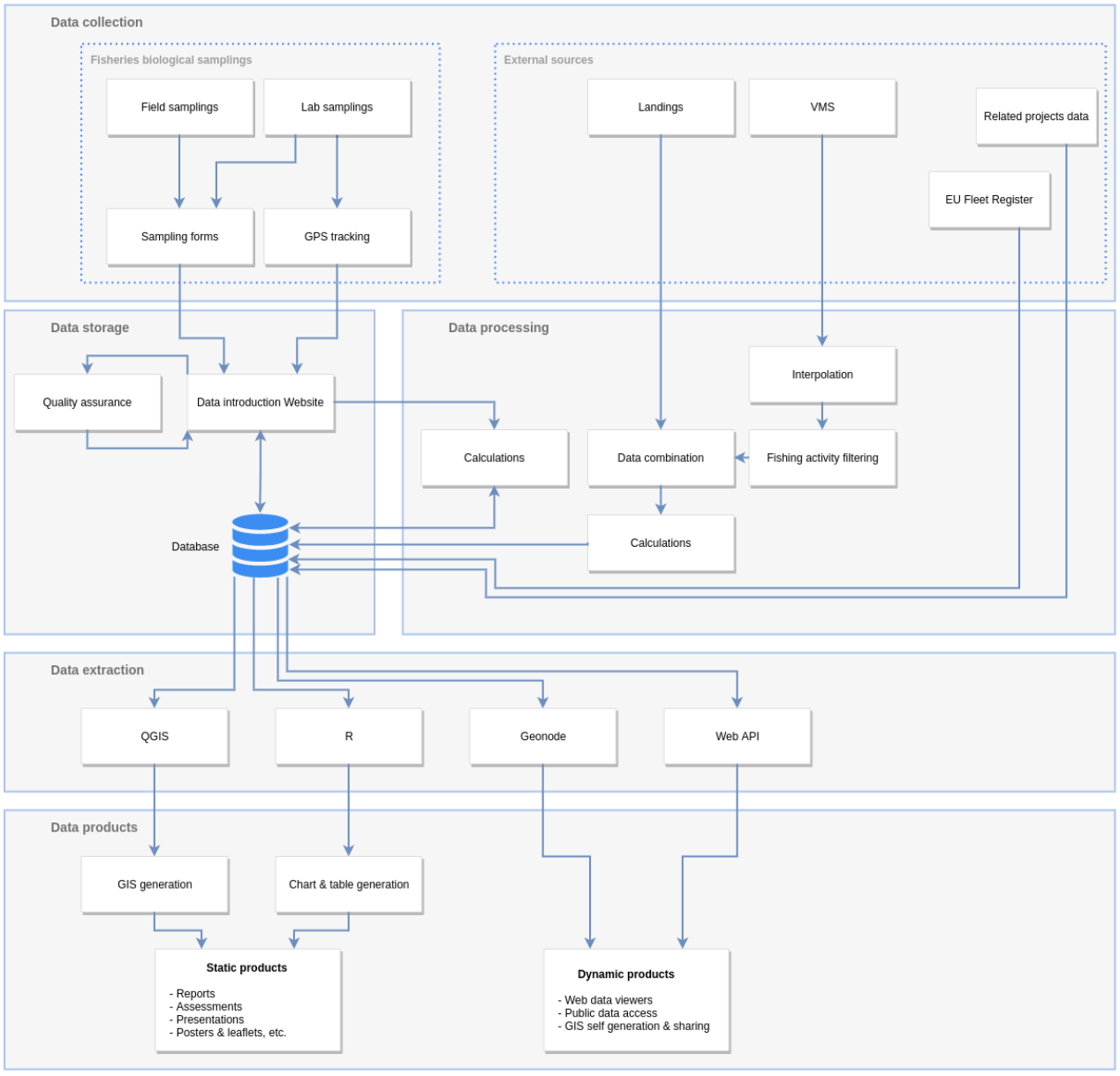


Figure 98. Workflow for ICATMAR data input, storage and exploitation. Different technologies and concepts are specified including upgrades done in 2021.

Data input

One of the main data sources of ICATMAR is the field sampling done on board commercial fishing vessels (Section 1 of this report). In order to improve efficiency and quality in data input, a website was developed to allow field data introduction to ICATMAR databases. This system allows all samplers to introduce data autonomously, to implement automatic data checks to reduce errors in data stored in databases, and perform automatic calculations to help in their analysis. As the sampling is being modified and expanded to other fleets besides bottom trawling, the website and database structure need to be updated to incorporate sampling specifications and continuous improvements.

In all samplings on-board and in the laboratory, data are collected in sampling forms and entered in the website in order to centralize information, improve quality, relate data concepts and perform the corresponding calculations.

Purse seine on-board sampling

As the website and database were already allocating purse seine sampling from the fishing markets, only a few changes had to be performed in order to also support on-board sampling, which is currently in a testing phase. To extrapolate the samples measured on-board and in the laboratory, the following fields have been added per haul: total weight of the catch, total weight released alive, the number of boxes, and the weight of each box (Fig. 99).

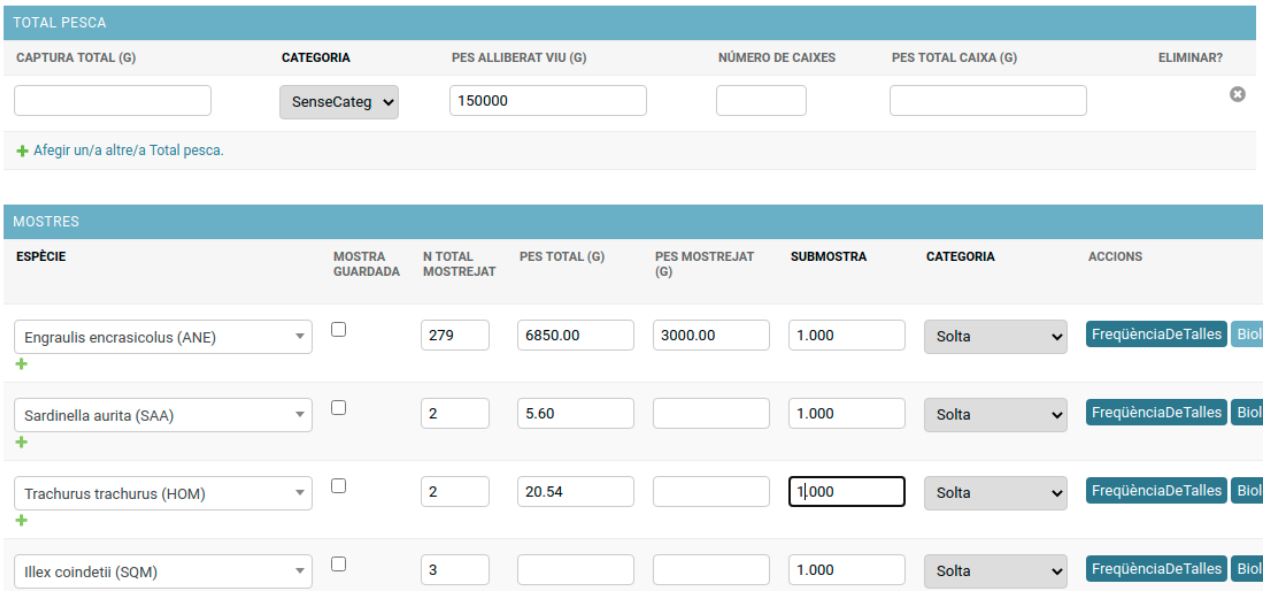


Figure 99. Example of a purse seine on-board sampling where the catch has been released. As one box of this release is sampled, the corresponding biological data is collected and marked as released.

New features have been added to the website so that samplers can register different types of situations specific to purse seine on-board sampling, such as the release of the catch, triage of the catch, or the performance of more than one haul for the same fish school.

Common octopus fishery

As part of the management plans of the common octopus of the Catalonian central coast and Ebre delta, some fields have been added to support the data collection for this sampling. In order to extrapolate the data collected during on-board sampling, some extra parameters have been added.

Sampling GPS data

Geographic information is crucial for field sampling data. It is especially important for trawling hauls, as the swept area must be calculated in order to obtain sampled species abundance and biomass values. For this reason, special efforts were directed towards the development of a tool for GPS data input and validation in the input data website. As fishing operations vary between fishing fleets, the data check protocol and structure had to be adapted to each fishing gear:

Bottom trawling fishery

During bottom trawling fishery sampling, all sampled hauls positions are registered in a GPS device. Point data is collected at a frequency of 1min. On-board positions are also collected every 15 min from the moment the fishing gear starts fishing until it is collected again.

Input data website users can upload a .gpx file by haul and then visualize its data together with positions collected manually on board (Fig. 100). GPS track will automatically be cut at the start and end trawling positions so only the positions corresponding to the fishing haul are registered. The total swept area by haul is obtained from combining the total trawled distance – considering all points – and the fishing gear mouth opening distance. All information is automatically stored in the database.

Purse seine and sand eel fishery

There are two main objectives under geolocating purse seine and sand eel samplings: locating the sampled species and understanding the spatial dynamics of the fleets. To do this, all sampling cruises are registered with a GPS device, from the moment of port departure until the vessel returns. All operations are registered at a frequency of 1 min, and fishing operations are marked with a waypoint. Website users upload a .gpx file including all cruise information. Fishing positions can be compared with manually on-board registered positions, and cruise positions are cut from the moment of departure until the return to portand all information is stored in the database for further treatments (Fig. 101).

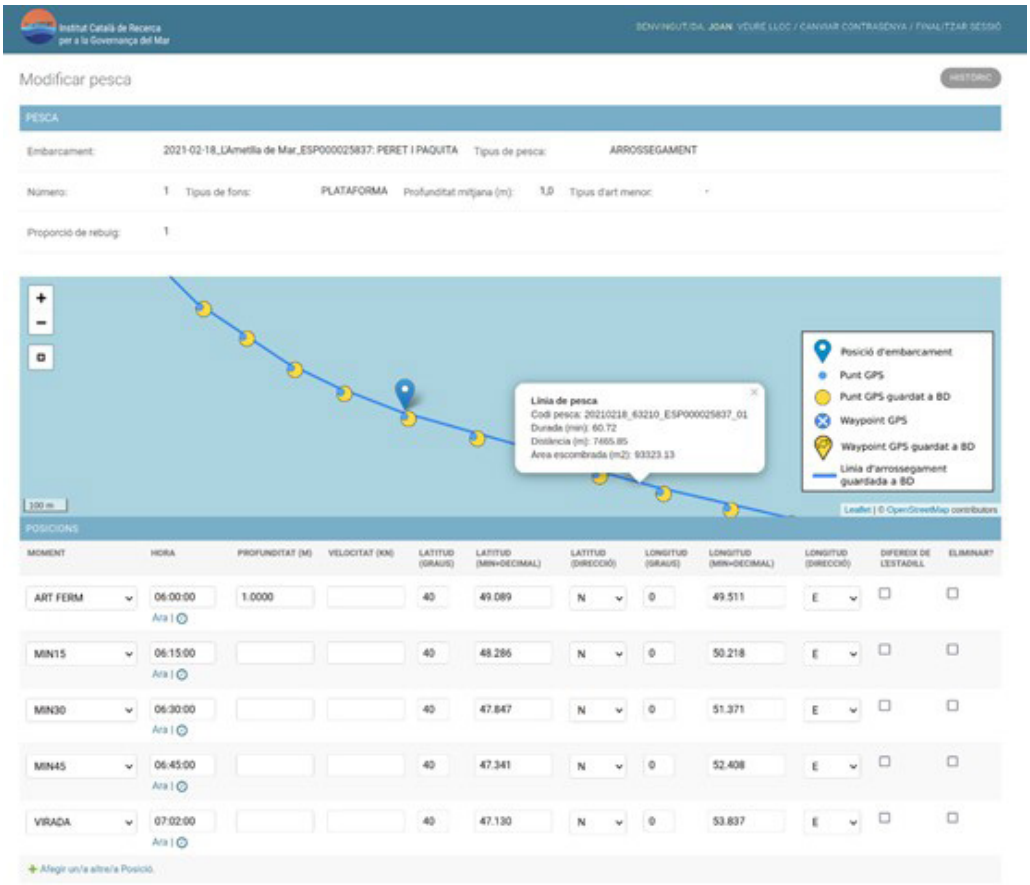


Figure 100. Example of bottom trawling sampling GPS data input through input data website. GPS points (blue), stored points in the database (yellow), trawled line and manually introduced positions (blue pointer) are shown. Users can check data stored in the database.in the database.

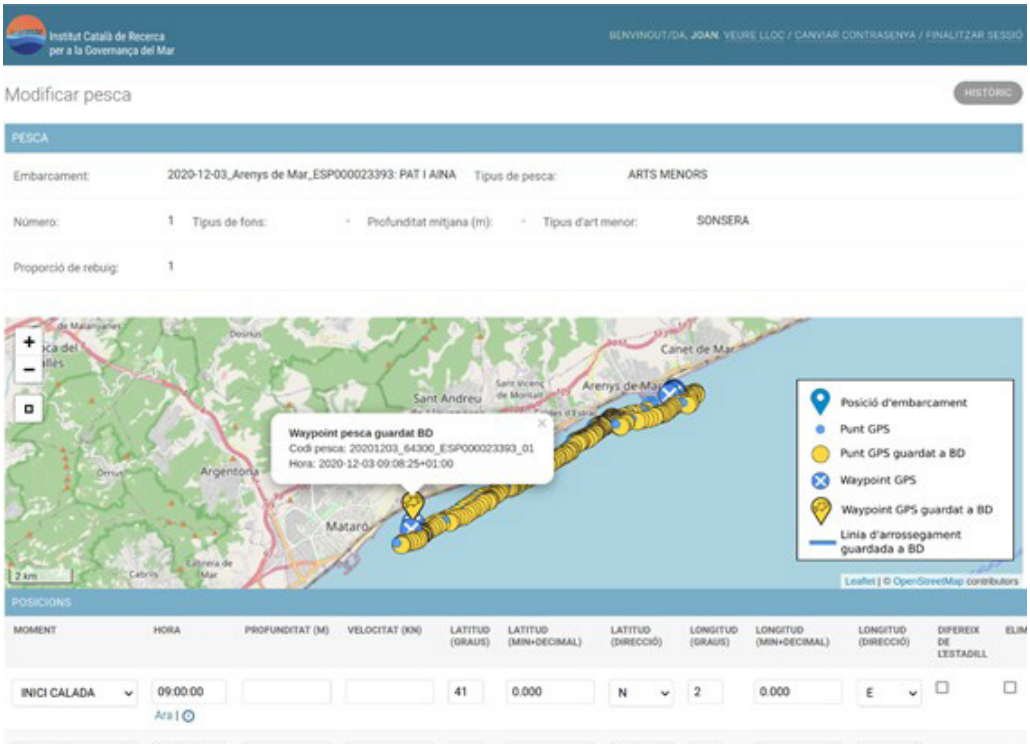


Figure 101. Example of purse seine sampling GPS data input through input data website. Raw GPS points (blue), stored GPS track points (yellow) and fishing positions (fish icon) are shown.

Common octopus (Octopus vulgaris) fishery

Octopus vulgaris fishery uses pots and traps lines that are set on the sea bottom and collected a few days after. On-board sampling involves the collection of the fishing gear lines. Each haul positions are registered with a GPS device and initial and final positions are noted manually on board. Once the website users upload the .gpx file for each haul, points between start and end positions are stored in the database (Fig. 102). In addition, since a haul may consist of more than one line, points between lines are deleted, storing only positions where boat speed is between 1 and 9 km/h.

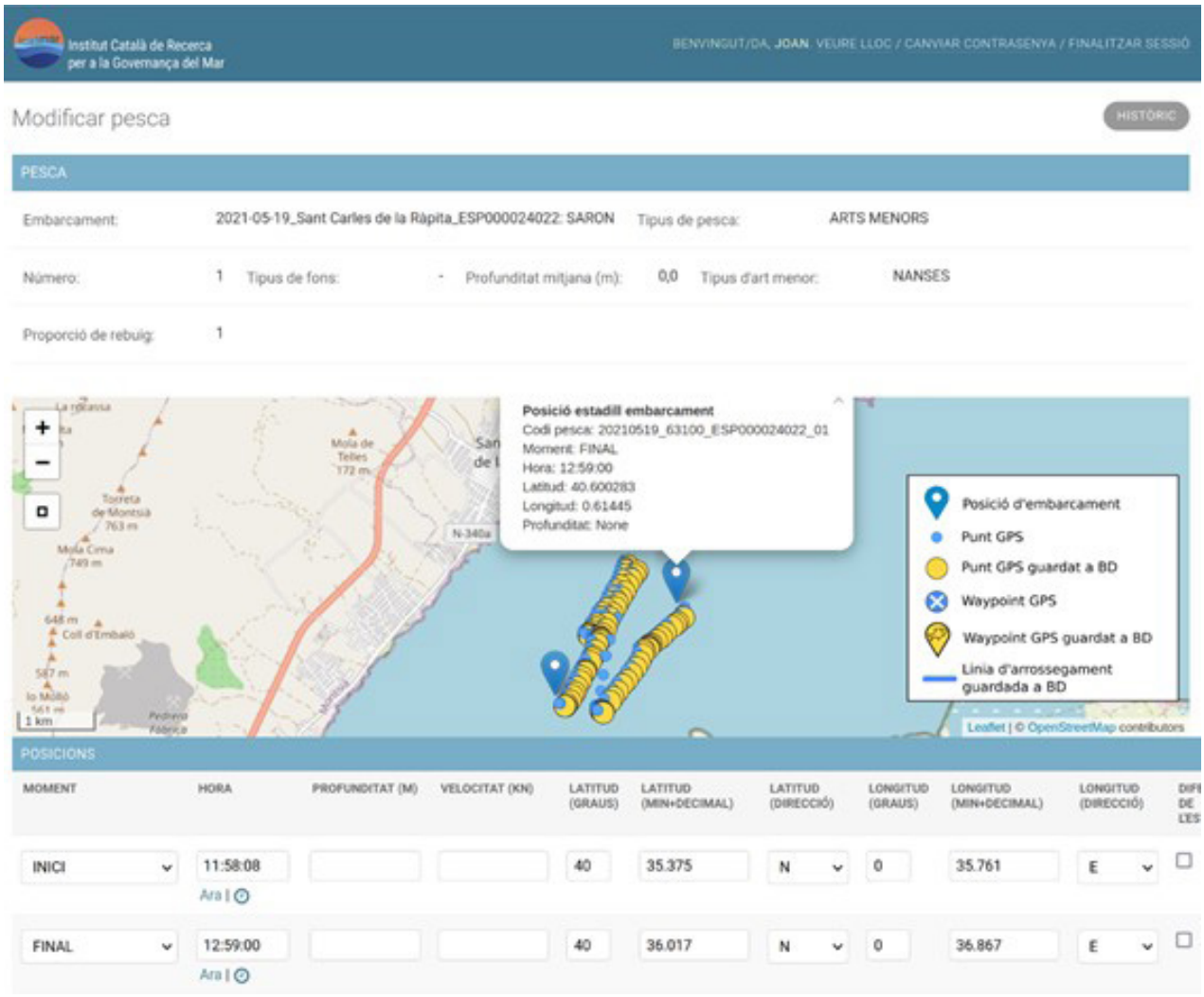


Figure 102. Example of pots/traps sampling GPS data input through input data website. Raw GPS points (blue), stored GPS points (yellow) and manually introduced positions (blue pointer) are shown. Positions between fishing lines are not stored in the database following the speed filter applied.

External data: keeping updated

As described in previous reports (ICATMAR 2020), an important part of the data stored in ICATMAR database corresponds to external data sources (Fig. 98). All these datasets must be kept updated, since most of ICATMAR data analysis and reports depend on them. The main information sources are Vessel Monitoring System (VMS) geolocation data, landings data, and fleet register datasets.

- **EU Fleet register** information is downloaded from the official fleet register website. This is crucial information that will be linked with practically all datasets used in ICATMAR databases. It is necessary to update it as the number of active vessels may change or active vessels can vary their port base or fishing gears.
- **Landings data** are periodically received from the Catalan Fisheries Secretariat. Data must be validated, cleaned, linked with fleet register data, and stored.
- **VMS data** are periodically received from the Spanish Fisheries Secretariat. Data must be validated in multiple ways, cleaned, interpolated, structured, linked with fleet register and landings datasets, and stored.
- **Geoblau** is a new positioning system implemented by the Catalan Fisheries Secretariat. All fishing vessels (with no length limits, contrary to VMS system) will mandatorily be equipped with Geoblau devices to track their position, speed and course at a high time frequency. At the moment, the system is in testing phase but first contacts with ICATMAR have been done in order to exchange expertise in geographic tracking of fishing fleets and to help its development. Geoblau data storing systems is also being discussed as ICATMAR needs to be able to access Geoblau data easily to complement the fisheries spatial analyses that are already being done with other positioning systems.

Other projects

Since ICATMAR is located within the Department of Marine Resources of the Institute of Marine Sciences (ICM-CSIC), ICATMAR team has taken the opportunity to integrate datasets from different scientific projects regarding fisheries in its input website, thus rendering data access easier for the users in the Department. As a general way of dealing with different teams introducing data for different projects, the data introduction website has been adapted to support a system of privileges depending on the identity of the logged user. In this sense, each user can only view and edit the group of projects to which they are previously assigned..

Two of these projects which are especially useful for further analysis, 50SELS and 4550SELS, are focused on fishing gear selectivity. To evaluate the selectivity of mesh sizes of 45 and 50 mm of the bottom trawling fishery, different actions have occurred to integrate related data in ICAT-

MAR's information systems. The database and data input website have been adapted to collect data from cod-end cover fraction. The main changes implemented are related to data input, storage, validation and calculations. Minimum lengths for many species have been updated, as cod-end cover catch smaller individuals. Once these new functionalities were developed, all data from 50SELS project have been imported in the database, consisting of 42 hauls, almost 300 positions and more than 25 000 measured individuals. Then, a group of biologists entered the data from 4550SELS project through the data input website, consisting of 83 hauls, more than 900 positions and 80 000 measured species.

Another external project that uses the ICATMAR data input website and database is the sampling of the cuttlefish (*Sepia officinalis*) fishery. As part of the management plan of the cuttlefish in Pals and Roses bays, a new protocol was defined in order to allow data collection by the fishermen themselves. A reduced group (cuttlefish fishermen samplers), were collecting extended data, and others who were willing to participate (cuttlefish fishermen collaborators), were collecting reduced data. All the changes to allocate this new sampling were performed in the database and the website and the collected data on the sampling forms were entered.

Data storage

Updated database structure

The relational database has been created in PostgreSQL with PostGIS. The database has been designed as object-relational database, combining a relational database with an object-oriented model, to simplify object-oriented programming. The model of the database has been designed grouping the related fields in tables regarding each data concept, relating them with its corresponding cardinality and seeking to reduce data redundancy (Fig. 103). The database has been updated from previous versions to allocate new samplings and changes on the previous ones. The main objectives on these updates are reusing fields, unifying formats and storing related data in a common structure to simplify their combination, analysis and reusing the developed products.

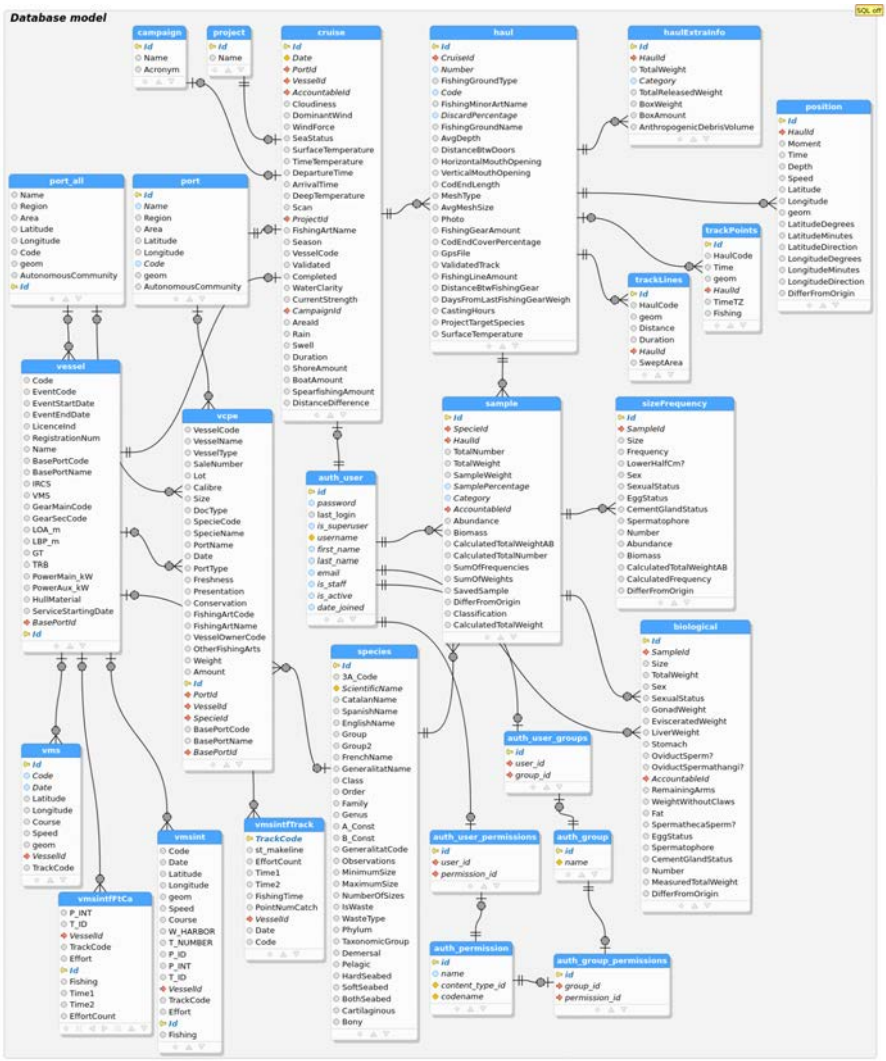


Figure 103. Database model. Each piece of information is structured and related in the database.

Database content

The fishing samplings started in October 2018. As of today, 941 fishing hauls have been sampled, registering 2 800 positions, measuring 270 000 individuals and dissecting over 49 000 of them (Fig. 104). On bottom trawling sampling, the trawled distance is 2 500 km.

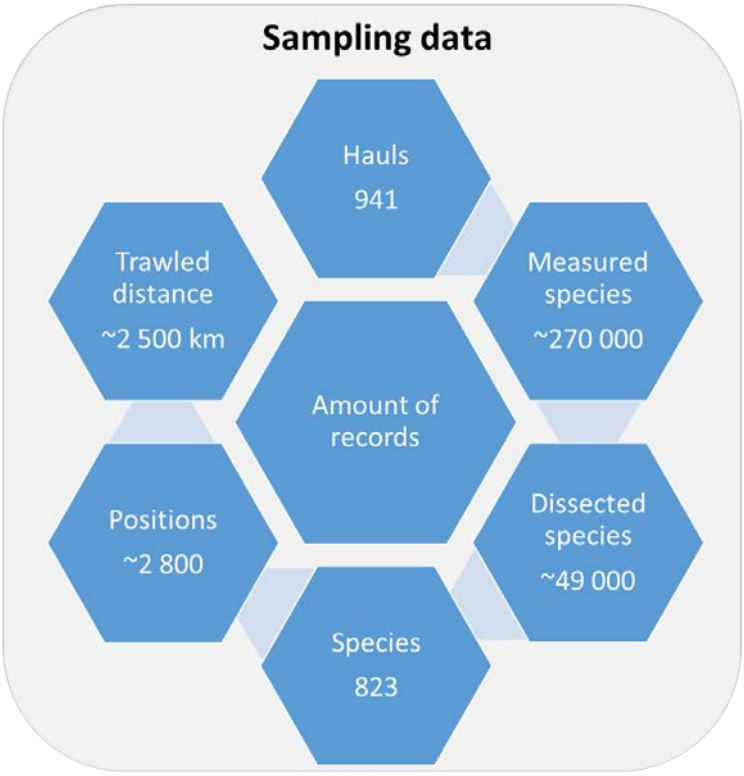


Figure 104. Amount of records of the fishing sampling data stored in the database.

Besides the project own data, external datasets are currently integrated in the database or could be integrated in the future on the same structure (Fig. 105). These datasets are directly related with the project and facilitate the overall analysis and evaluation.

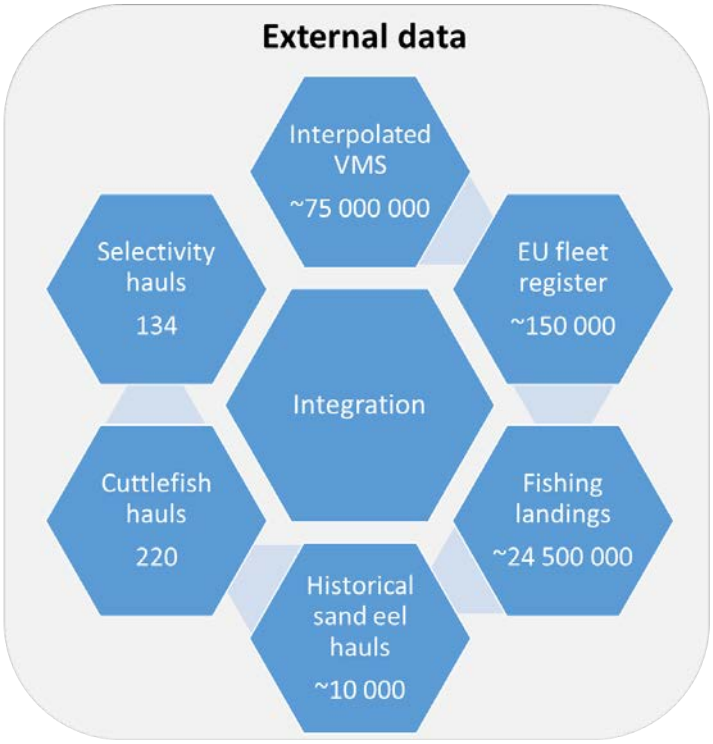


Figure 105. Amount of records some external data in the database.

Data processing

Improvements in data analysis. VMS interpolation

As described in previous ICATMAR reports (ICATMAR 2020), VMS data are used to calculate the spatial distribution of fishing effort and landings for the Catalan fleet. Until recently, trawling fleet data was analyzed using methodologies described in literature (Lee et al., 2010), while we used the methodology developed by ICATMAR (Sala-Coromina, 2020) for purse seine data. However, in the last few years improvements have been made in VMS analysis that had to be implemented in ICATMAR's routine analysis, mainly VMS interpolation.

VMS point frequency is set to a minimum of two hours between pings. Using this point frequency could miss vessel operations such as steaming phases between different hauls, or underestimate haul fishing times (Shepperson et al., 2018). In order to overcome these issues, a number of VMS interpolation methodologies have been developed with the objective of artificially reducing ping frequency and therefore calculating better estimates of spatial fishing footprints (Hintzen et al., 2010; Russo et al., 2011; Shepperson et al., 2018).

We have adopted a Cubic Hermite Spline interpolation method developed by Russo et al. (2011), using vmsBase R package (Russo et al., 2014) to interpolate raw VMS points to a frequency of 10min. At present, interpolation methods have been implemented to the bottom trawling fleet (Fig. 106), since this methodology still needs to be validated for the purse seine fleet.

Sampling biological calculations

In order to simplify the analysis, standardization and extrapolation of the collected data, some parameters are calculated automatically when the data is entered through the website. Some changes on the input data require a full recalculation of all parameters, therefore this recalculation is performed nightly not to slow down the user responsiveness of the website.

The calculations take into account the proportion of each fraction of the catch that is brought to the laboratory for analysis In all cases, if the sample is not part of the discard or cod-end cover fractions, the proportion is always 1.

Each measure of individual length taken in the laboratory corresponds to a particular haul, species and species size category. For each of these values, the following parameters are calculated:

CalculatedFrequency (ind): Extrapolated amount of individuals of the same length. The individuals are grouped every half cm depending on the species.

$$CalculatedFrequency = Frequency * SampleProportion * DiscardProportion * CodEndCoverProportion$$

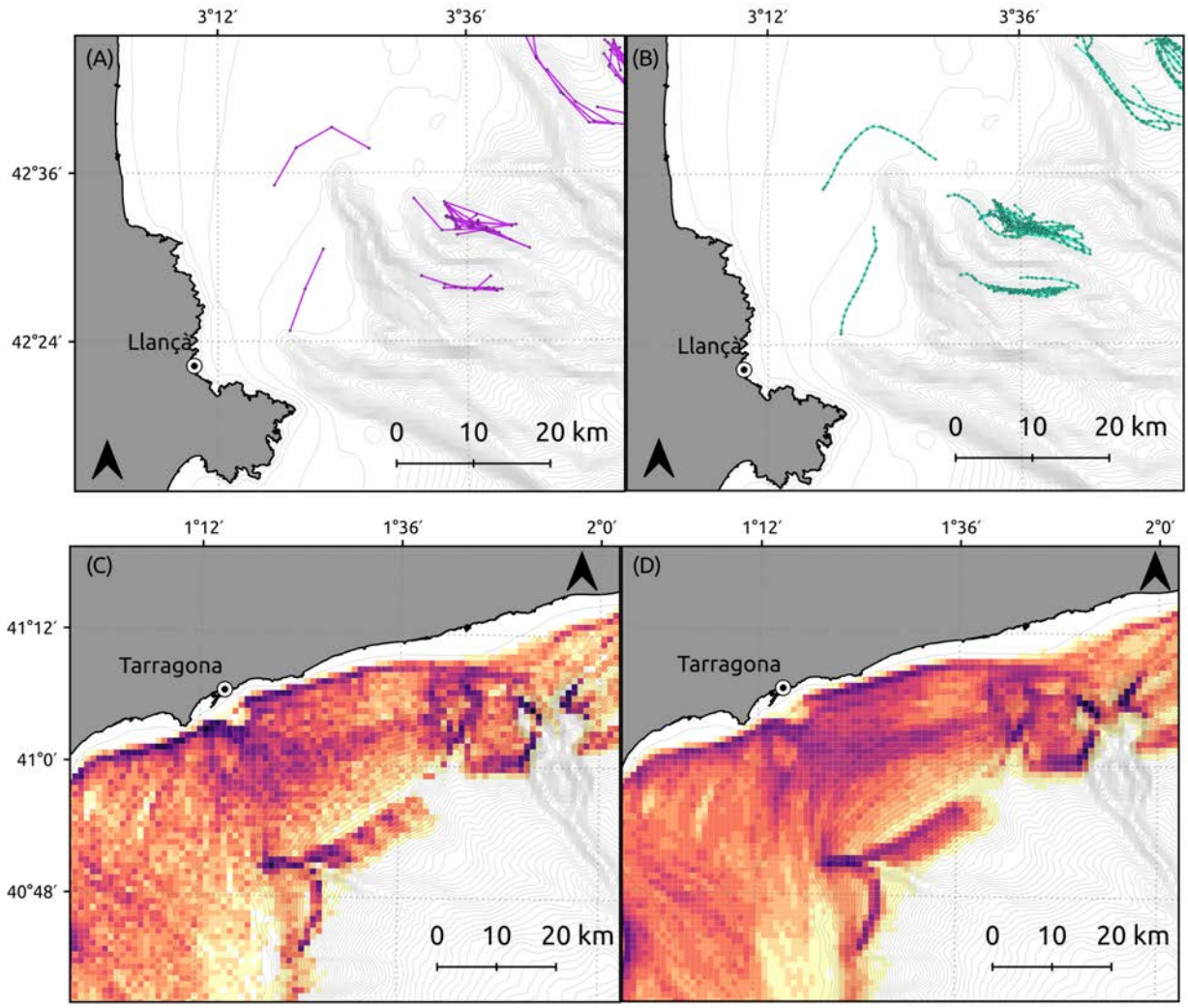


Figure 106. Comparison between raw and interpolated VMS data treatment. In figures A and B it can be compared the result of the interpolation (B) compared to raw VMS points (A) when calculating fishing tracks for a specific vessel. In figures C and D it is shown how spatial resolution improves when using interpolated data (D) instead of raw VMS points (C) once accounting for accumulated annual fishing effort by km^2.

Abundance (ind/km^2): Extrapolated amount of individuals of the same length per km^2 (only for bottom trawling sampling).

$$AbundancePerLength = \frac{CalculatedFrequency}{SweptArea}$$

TotalCalculatedWeightParamsAB (g): Extrapolated total weight obtained from transforming the length of the measured individuals into its corresponding weight with the length-weight relationship of the species.

$$TotalCalculatedWeightParamsABPerLength = a * Length^b * CalculatedFrequency$$

Biomass (kg/km^2): Extrapolated biomass of the individuals of the same length per km^2 (only for bottom trawling sampling).

$$BiomassPerLength = \frac{TotalCalculatedWeightParamsABPerLength/1000}{SweptArea}$$

Each sample is a collection of data associated to a particular haul, species, and species size

category. For each sample entered into the website, the following parameters are calculated:

CalculatedTotalAmount(ind): Extrapolated amount of individuals.

$$CalculatedTotalAmount = TotalAmount * SampleProportion * DiscardProportion * CodEndCoverProportion$$

Abundance (ind/km^2): Extrapolated amount of individuals per km^2 (only for bottom-trawling sampling).

$$Abundance = \frac{CalculatedTotalAmount}{SweptArea}$$

TotalCalculatedWeight (g): Extrapolated total weight.

In case there is no total weight:

$$TotalCalculatedWeight = TotalWeight * DiscardProportion * CodEndCoverProportion$$

TotalCalculatedWeightParamsAB (g): Extrapolated total weight obtained from transforming

$$TotalCalculatedWeight = SampleWeight * SampleProportion * DiscardProportion * CodEndVoverProportion$$

each individual measured the length of the measured individuals into its corresponding weight with the length-weight relationship of the sample species. Frequency is the amount of individuals with the same measure because depending on the species the individuals are grouped each half cm.

$$TotalCalculatedWeightParamsAB = \sum_{x=1}^{TotalAmount} TotalCalculatedWeightParamsABPerLength_x$$

Biomass (kg/km^2): Extrapolated biomass of the sample (only for trawling sampling).

$$Biomass = \frac{TotalCalculatedWeight/1000}{SweptArea}$$

In case there is no TotalCalculatedWeight:

$$Biomass = \frac{TotalCalculatedWeightParamsAB/1000}{SweptArea}$$

At the present moment, the dissemination channels of ICATMAR data analysis products are mainly technical reports. Due to the fact that most of the geographic products have to be generated annually, their production has been automated using QGIS and R directly connected to our database (Fig. 98).

Data visualization

ICATMAR web architecture has been designed with the aim of improving the scientific knowledge transfer to different agents and having a dynamic way of accessing and visualizing analyzed data (Fig. 107). A new ICATMAR website will be developed to provide information about the institution, related services, team, publishing reports and related news. To simplify data sharing and visualization the website will host two data viewers: one of them oriented to the general public, and the other focused on the needs of the scientific community.

General viewer

The general viewer will provide access to ICATMAR sampling data in a dynamic way for the general public without user login. It is currently in a prototype phase and is being developed to fulfill all possible related requirements for bottom trawling fisheries. The prototype has been developed in collaboration with Xarxa Maritima de Catalunya.

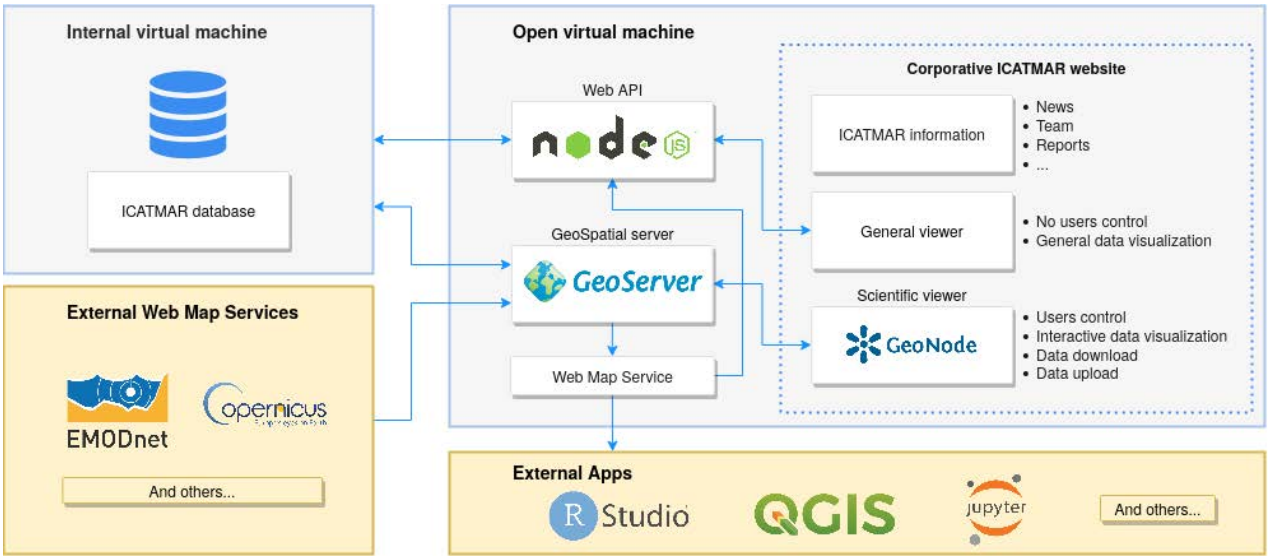


Figure 107. Structure of ICATMAR dynamic visualization systems.

As the sampling is spread along the Catalan coast, dynamic pie charts have been developed to visualize the biomass of species (kg/km^2) on the different sampled areas and ports (Fig. 108). By selecting a specific port, the related catch composition (landed, discarded and debris) is displayed, with the proportion of species and debris for each fraction. In addition, a comparison between two different ports or areas can be viewed. Besides this spatial visualization, the same type of information and comparisons can be viewed with the data grouped temporally by season of the year.

Having information about the trends in length structure of the species is important for evaluating the status of the species. Therefore, length frequency is visualized dynamically for all sampled species in number of individuals per km^2 (Fig. 109). The length frequency can also be compared between species.

Figure 108. Sampling catch composition between areas and ports (left) and la Ràpita port (right) of ICATMAR's general viewer.

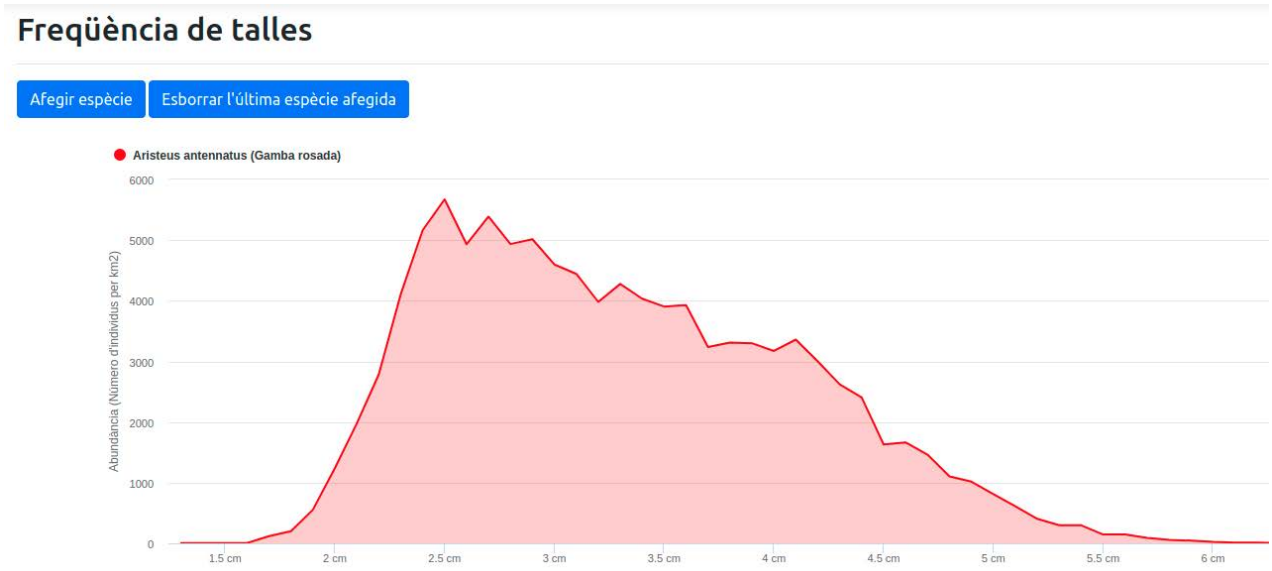


Figure 109. Species size frequency representation for Aristeus antennatus of ICATMAR's general viewer.

A Web API (Application Programming Interface) has been developed in NodeJS to get all processed and validated data from the database and serve it to the web general viewer.

Scientific viewer

For further data sharing and management, a scientific viewer is being designed and will be accessible through ICATMAR website as well.

The main objective of this viewer is to give access to all available ICATMAR datasets, either geographic or not, to a variety of users. The system allows the publication of layers stored in ICATMAR databases or static datasets (Fig. 110). Each layer contains its metadata, specific styles and attributes. Users can view data, change between available styles, make maps combining layers (Fig. 111) and download drawn maps and specific layers.

Technologies used will be Geoserver and Geonode, a Django-based website that allows users management. Therefore, users access to published data can be controlled together with their permissions to interact with layers. Moreover, through Geoserver a Web Map Service (WMS) system can be designed and therefore data use can be maximized through different platforms.

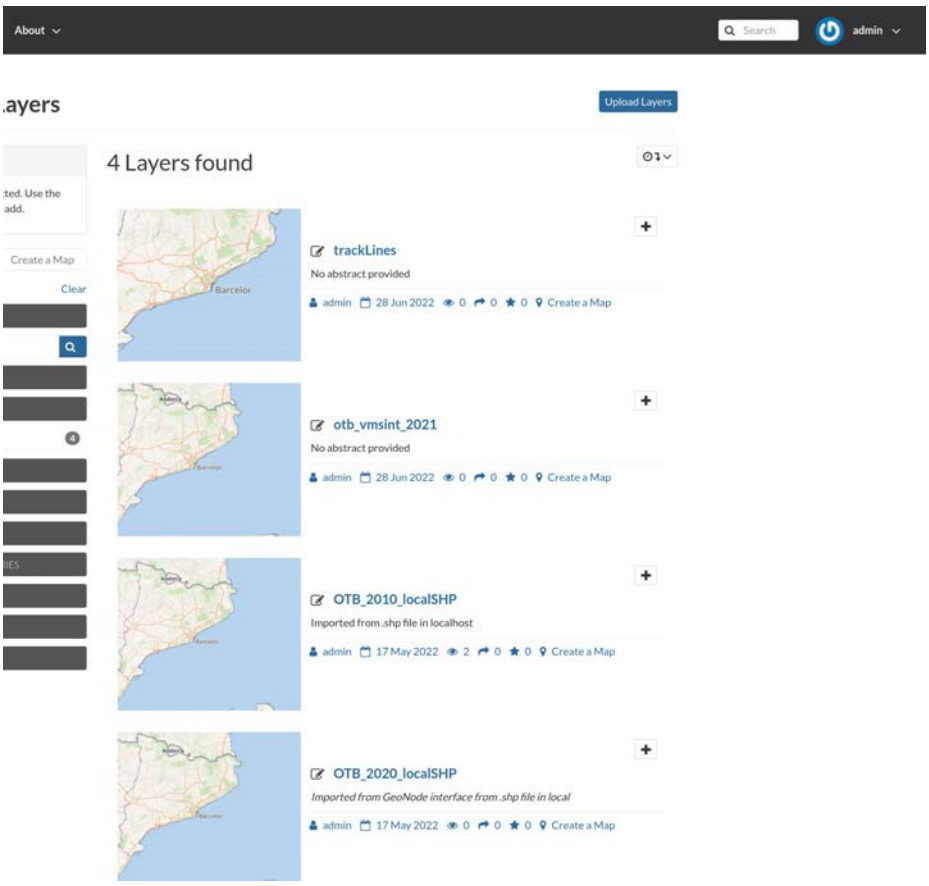


Figure 110. Layer exploring page of ICATMAR's scientific viewer. All available layers can be explored individually to get information about data source, authors and other metadata. Layers can also be individually downloaded in different formats.

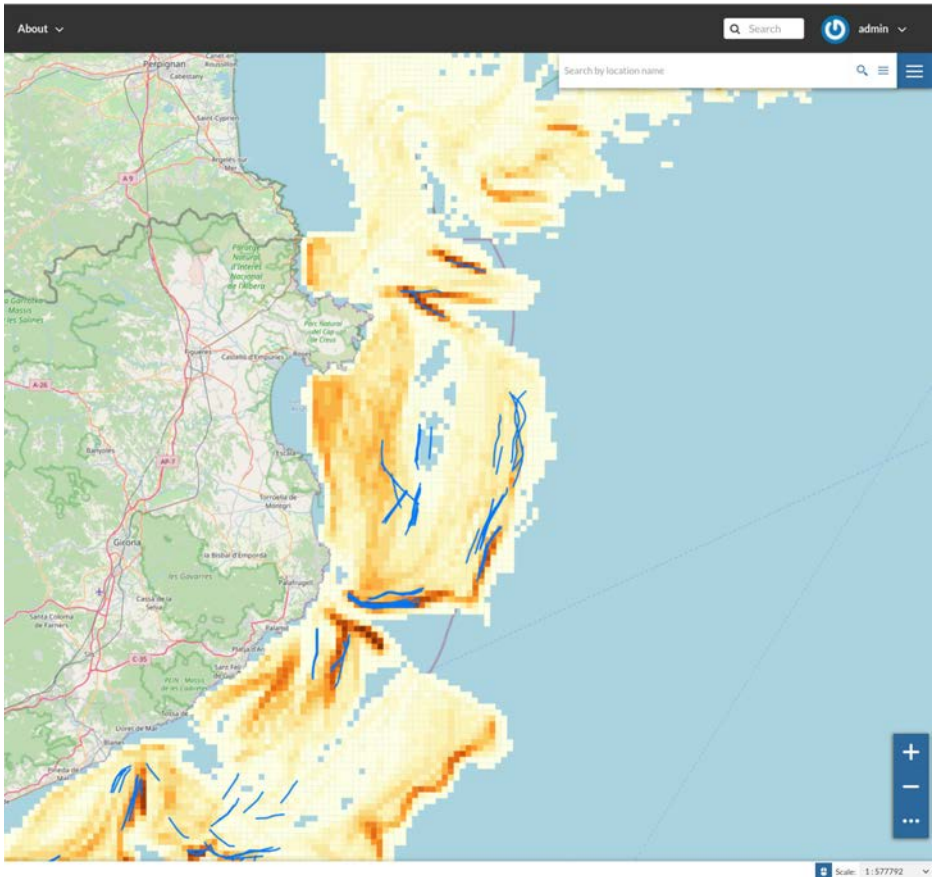


Figure 111. Map exploring page of ICATMAR's scientific viewer. Available layers can be combined so different datasets can be compared. In this example, the fishing effort of the Catalan bottom trawling fleet is combined with the SAP trawling sampling hauls.

SECTION 3

Temporal persistence and spatial differentiation of the bottom trawling fishery métiers

Introduction

In 2019, a European regulation established a multi-annual plan (MAP) for the demersal fishery in the north-western Mediterranean (EU) No 508/2014). To achieve the goal of maximum sustainable yield by 2025 at the latest, the regulation proposes several measures, i.e. defining a maximum number of fishing days per year (Art.7), creating measures on gear selectivity (Art.13), determining minimum reference sizes (Art.13) and establishing temporary and spatial closures (Art.11). Trawling in the Mediterranean is multi-specific, with more than 150 species (Osio et al., 2015). However, only five species are subject to management measures and are periodically evaluated at the Geographical Sub-Area (GSA) level (GSA06, in the case of NW Mediterranean) by official bodies, such as the Scientific, Technical and Economic Committee for Fisheries (STECF) and the General Fisheries Commission for the Mediterranean (GFCM). These species are hake (*Merluccius merluccius*), red mullet (*Mullus barbatus*), blue and red shrimp (*Aristeus antennatus*), Norway lobster (*Nephrops norvegicus*) and deep-water rose shrimp (*Parapenaeus longirostris*).

The Catalan coast, representing, approximately, the northern half of the GSA06, has been defined as the study area. It is characterized by having distinguished bathymetric ranges: coastal shelf (25–100 m), deep shelf (101–200 m), upper slope (201–500 m) and lower slope (501–800 m), (e.g. Massutí & Reñones, 2005). There are 23 fishing ports throughout Catalonia, 14 of them having bottom otter trawl (OTB) fleet. Within the Catalan demersal fleet, trawlers represent 75% of both catches and income, 38% of the vessels and 82% of the GT (gross tonnage) (source: Generalitat de Catalunya, 2020).

The European Common Fisheries Policy recognizes the importance of accounting for heterogeneity in fishing practices promoting a métier-based sampling as the core of the EU Data Collection Framework. A *métier* is defined as a group of fishing operations that aim for a similar group of species using similar fishing gear during the same period and / or in the same area and with a similar pattern of exploitation (DCF, Regulation (EC) No 949/2008 and Commission Decision 2010/93 / EU). Given this definition, considering the characteristics of the NW Mediterranean fishery, and the current legislative framework, two main objectives have been defined for the present work:

- Define a protocol to identify *métier*s along with their temporal and geographical evolution;
- Characterize the bottom otter trawl (OTB) fleet by *métier* considering four facts: main target species, by-catch harvested community, temporal persistence, and spatial deployment.

Métiers identification by port

To identify *métier*s by port for the Catalan bottom trawling fleet (OTB), the same methodology was used as described in ICATMAR, 2021-02. Landings and revenues from 2002 to 2021 were used, accounting for approximately 15 million records. At each port (a total of 14 with OTB fleet), dendrograms and cluster analysis were performed, and then for each trip (vessel + day), the corresponding *métier* was assigned. Given the properties of the *métier*s, all ports of the Catalan coast were grouped by zones to facilitate the interpretation of the data globally. For more detail, Table 13 defines the different *métier* codes and names for the different ports grouped by zone, i.e. north, center and south. Then, all new data was added to the initial database and a Principal Component Analysis (PCA) was performed to check the spatial distribution.

Métier code	Métier name	Zone occurrence
OTB1	Coastal shelf	North/Center
OTB1A	Coastal shelf (south A)	South
OTB1B	Coastal shelf (south B)	South
OTB2	Deeper shelf	North/Center
OTB2A	Deeper shelf (south A)	South
OTB2B	Deeper shelf (south B)	South
OTB3	Upper slope	North/Center
OTB4	Lower slope	North/Center

Table 13. Métier codes and names for each zone.

Data analysis shows that the horizontal axis of the PCA (Fig. 112) indicates that 45% of the variability is caused by the species composition of the catch. This fact determines a difference between the species composition of the shelf *métiers* (OTB1, OT- B1A, OTB1B, OTB2, OTB2A, OTB2B), as shown in the right side of the figure, and the slope *métiers* (OTB3, OTB4), seen on the left side of the figure. The vertical axis from Figure 112 describes the 17% of the variability, indicating that the difference between the shelf *métiers*, that is coastal shelf *métiers* (OTB1, OT-B1A, OTB1B) and deeper shelf *métiers* (OTB2, OTB2A, OTB2B), are smaller. Similarly, there is less variability between the upper slope *métiers* (OTB3) and the lower slope *métiers* (OTB4). Figure 112 also shows that the ports from the north and the center of the Catalan coast present two shelf *métiers* (OTB1- OTB2) and two slope *métiers* (OTB3-OTB4). The south zone has a different dynamic because all the ports present four shelf *métier*s, two from costal shelf (OTB1A, OTB1B) and two from deeper shelf (OTB2A, OTB2B); except L'Ametlla de Mar port, which also presents the lower slope *métier* (OTB4).

A different PCA was plotted to understand the species that drive the different métiers (Fig. 113). The horizontal axis of the PCA explains the largest part of the variability within the catch composition. In the coastal shelf *métiers* of the southern Catalan coast (OTB1A, OTB1B) the most important species was the spottail mantis shrimp. In the coastal shelf *métier* (OTB1) of the center

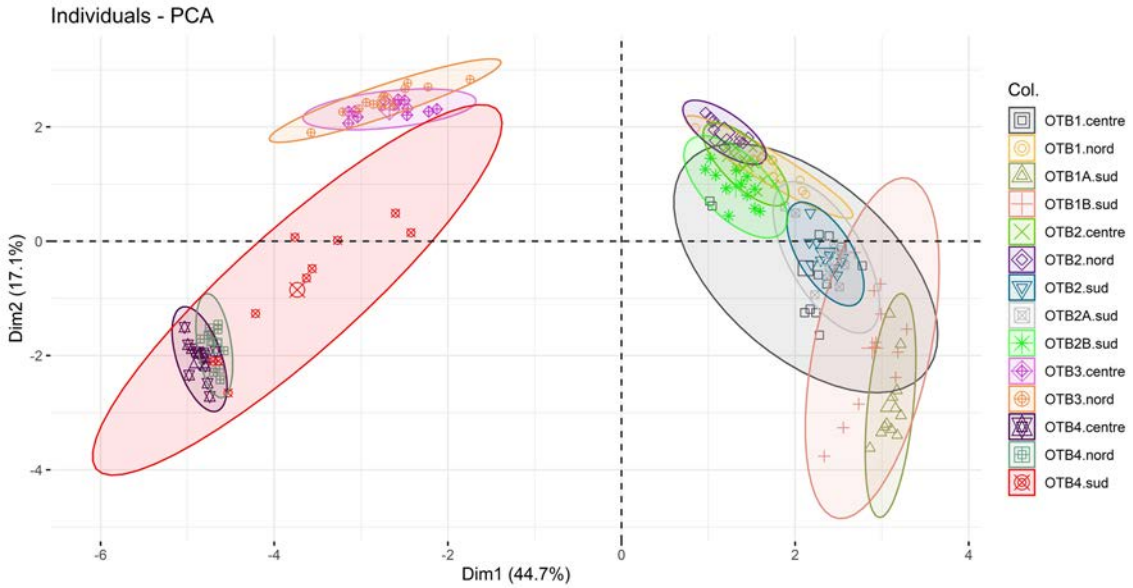


Figure 112. PCA shows the trips grouped by month for all the ports of the Catalan coast with trawling fleet differentiated by métier and zone (color and symbol) for the period 2017-2021.

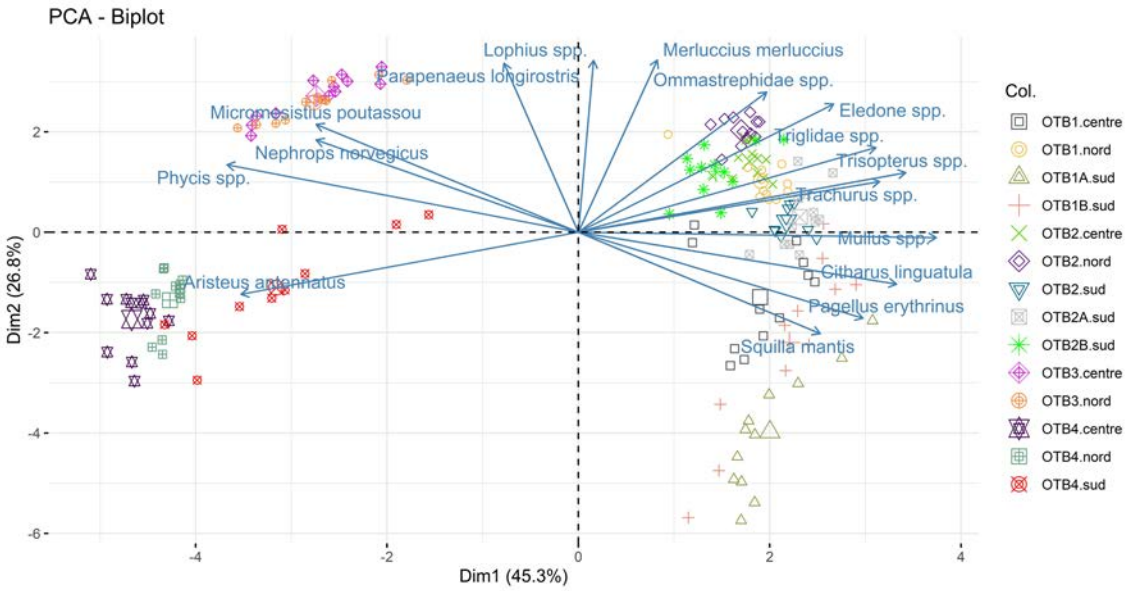


Figure 113. PCA represents the trips grouped by month for all the ports of the Catalan coast with trawling fleet differentiated by *métier* and zone (color and symbol) for the period 2017- 2021. The species that contribute to the 75% of the landings for this period are also shown; each arrow indicates the *métier* and zone in which they are more important in terms of landings.

zone, the most prominent species were the sea-bream (*Pagellus erythrinus*) and the red mullet, and for the north coast, the mackerel (*Trachurus* spp.) and the octopus genus *Eledone* spp. Some of the most landed species from the deeper shelf *métiers* (OTB2, OTB2A, OTB2B) were shared in all zones of the Catalan coast; for example the mackerel, *Eledone* spp, the cephalopod family *Ommastrephidae*, and the hake. In the upper slope *métier* (OTB3) of both the north and center

zone, the Norway lobster and the blue whiting (*Micromesistius poutassou*) are the most relevant. Finally, blue and red shrimp was the only species shown for the lower slope *métier* (OTB4), highlighting its importance.

After verifying the normality of the residuals (Fig. 114), a statistical test was performed (Table 14). The results showed that there were significant differences (p-value < 0.001) among *métier*s and among years, but not among the interaction *métier*s and years, indicating a *métier* consistency during the time series. The statistical analyses were also performed by port (Annex 2).

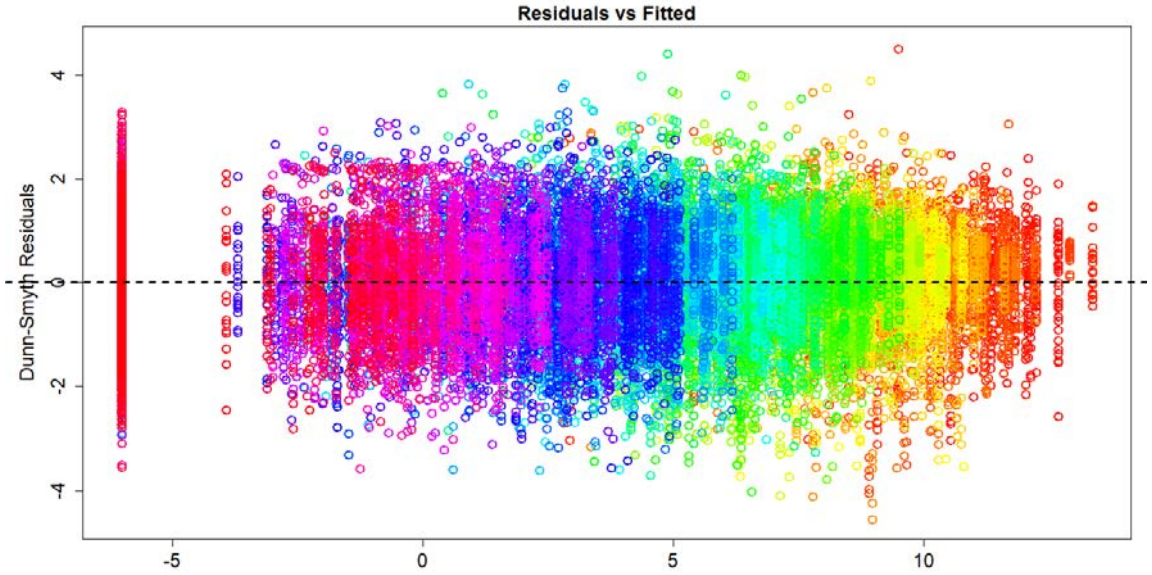


Figure 114. Residuals distribution and adjusted data using a negative binomial model for bottom trawler métiers.

Multivariate test ANOVA	Res.Df	Df.diff	Dev	p-value
Métier-Métier	152	7	17099	0.001***
Year-Year	151	1	3956	0.001***
Métier-Year	144	7	3434	0.067

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 14. ANOVA test results indicating significant differences (*) for bottom trawler métiers. Residuals (Res. Df), degrees of freedom (DF. Diff), deviation (Dev) and p-value are reported.

Temporal persistence by zone and *métier*

Species composition

For the north zone (Fig. 115) the species landed the most on the coastal shelf were the mullets, which increased the percentage of landings over the years, and mackerel. On the deeper shelf, *Eledone* spp added up to 25% of the landings, despite that the hake was the most important species. For the upper slope *métier* the species most landed was the blue whiting, followed by the Norway lobster. Finally, in the lower slope, the blue and red shrimp dominated the landings, with over 50%.

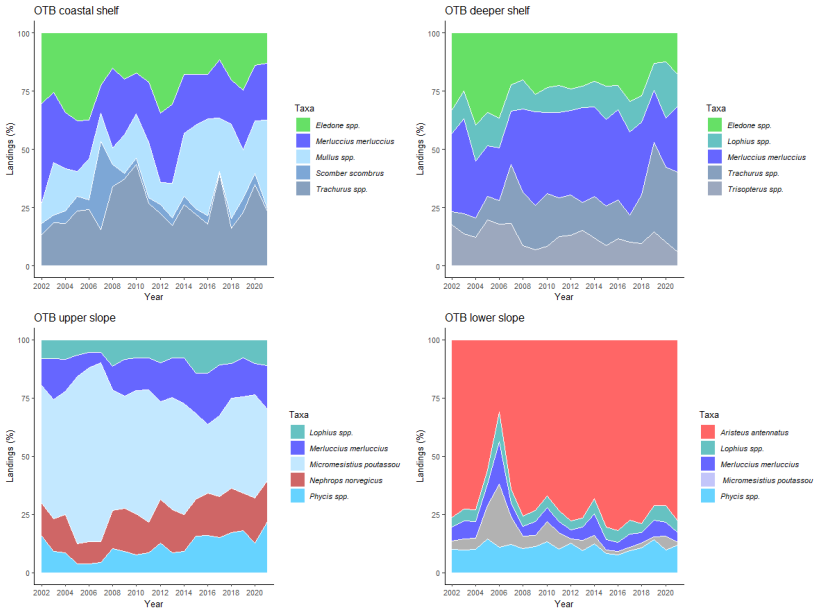


Figure 115. Most important species in terms of landings percentage for the four métiers of the north zone of the Catalan coast during the period (2002-2021).

For the center zone (Fig. 116) and in the coastal shelf *métier*, the red mullet was the species most landed increasing the percentage throughout the years. In the deeper shelf, *Eledone* spp decreased the percentage of landings during the last years. On the contrary, landings of monkfish (*Lophius* spp.), hake and Ommastrephidae, slightly increased. In the first years on the upper slope *métier*, the blue whiting and the hake were responsible for the 50% of the landings; in the last years, the percentages of Norway lobster and *Phycis* spp. have increased. In the lower slope, the blue and red shrimp was the most important species and increased the percentage of landings throughout the years.

In the south of the Catalan coast all *métiers* were from the continental shelf (Fig. 117). In the coastal shelf *métier* A, the most important species were the spottail mantis shrimp and the red mullet, which have increased the percentage of landings during the last years. In the coastal shelf B, the spottail mantis shrimp was responsible for more than 25% of the landings. In the

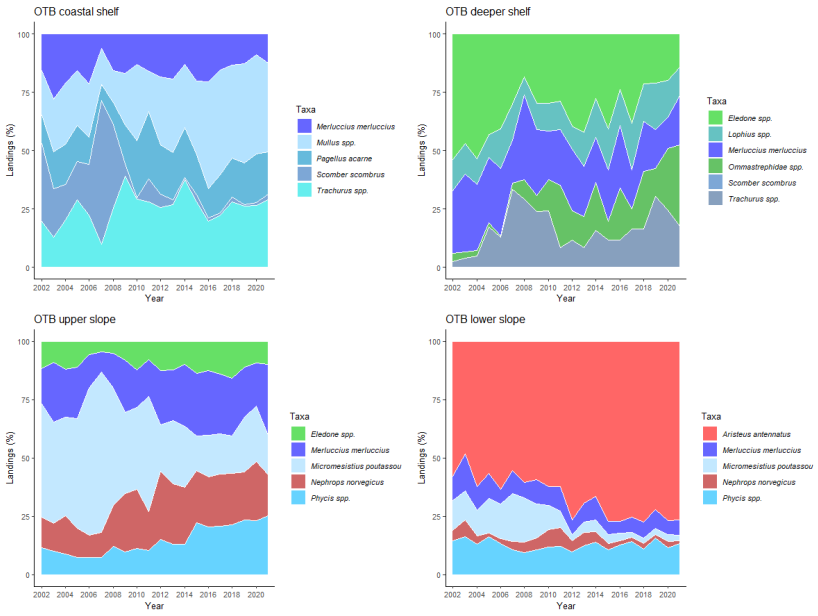


Figure 116. Most important species in terms of landings percentage for the four métiers of the central zone of the Catalan coast during the period (2002-2021).

deeper shelf *métier* A, hake and the spottail mantis shrimp were the most landed species accounting for the 25% of the landings, separately. In the deeper shelf B, the most relevant species were mackerel, which landings decreased throughout the years, and hake together with *Ommastrephidae*, both with increasing landings over time.

The species composition and landings (kg) by port and by métier for the time series 2002 to 2020 are reported in Annex 3.

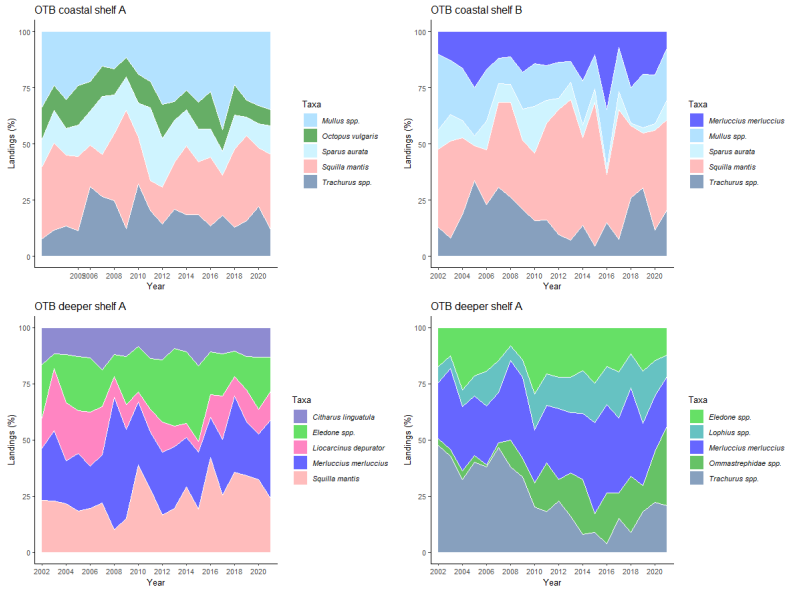


Figure 117. Most important species in terms of landings percentage for the four métiers of the south zone of the Catalan coast during the period (2002-2021).

Vessel Length composition

Figure 118 represents the total number of trips made by fishing vessels grouped in different Vessel Length (VL) categories in each *métier* for the north zone. In the coastal shelf *métier*, at the beginning of the time series, vessels from 18 to 24 meters represented around 50% of the trips. In recent years, though, the fleet was more variable with both bigger (VL 24-40 m) and smaller (VL 12-18 m) vessels present. For the deeper shelf *métier*, the number of trips with vessels from 18 to 24 m VL decreased but vessels from 12 to18 m VL increased. This amount of trips with bigger vessels (VL 24-40 m) was constant until the last two years. Then, the trips with bigger vessels decreased as opposed to small vessels (VL 6 to 12 m), which increased. For the upper slope métier, vessels from 18-24 m and 24-40 m VL were more abundant and those from 12-18 m VL were still present but as a minority. Finally, the lower slope *métier* was characterized by having bigger vessels. The ones with a VL from 24 to 40 m represented about 50%.

Figure 119 represents amount of trips made by fishing vessels grouped in different VL categories in each *métier* for the center zone. For the coastal shelf *métier*, at the beginning of the time series, there was a little of each VL group. However, in recent years, the trips from vessels ranging from 12 to 18 m VL increased. In the deeper shelf *métier* there was a clear dominance of 12-18 m long vessels throughout the time series, followed by smaller vessels (VL 6 to 12 m) and with just a few of the largest ones. For the upper slope métier, the amount of trips from the different vessels' groups remained constant but in the last five years, the number of trips with vessels from 12 to 18 m VL increased. Finally, the lower slope *métier* was characterized by a great amount of trips with boats from 24 to 40 m VL followed by those from 18 to 24 m.

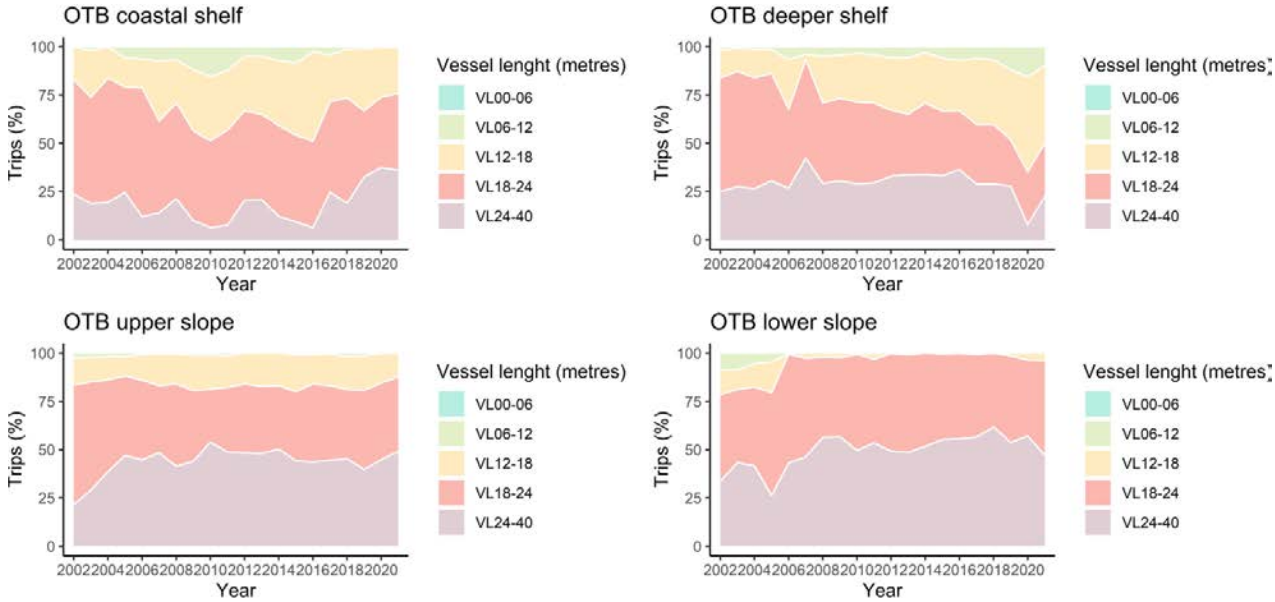


Figure 118. Vessel length (in meters) composition by métier for time series (2002-2021) for the OTB fleet in the North zone.

Figure 120 represents amount of trips made by fishing vessels grouped in different VL categories in each *métier* for the south zone. For the coastal shelf *métier* A, trips with boats from 12 to 18 m VL were dominant, also being abundant those from 18 to 24 m. On the coastal shelf *métier* B, early in the time series, 12-18 m vessels were dominant and those from 18 to 24 m increased. The case of the deeper shelf A *métier* is similar to the previous one, with a small increase in boats from 24 t o40 m VL. Finally, in the deeper shelf B *métier*, 12-18 m vessels were very scarce whereas those from 18 to 24 m VL were the most abundant and 24-40 m vessels considerably increased.

Number of vessels

Changes in the mean number of vessels fishing in each *métier* and their standard deviation for the time series (2002-2021) are shown in Figure 121. In general, all *métiers* present a decrease in number of vessels. This fact aligns with the reduction in the Catalan trawler fleet in the last 20 years, where the total number of vessels decreased by 42% since 2000 (ICATMAR, 2022-03).

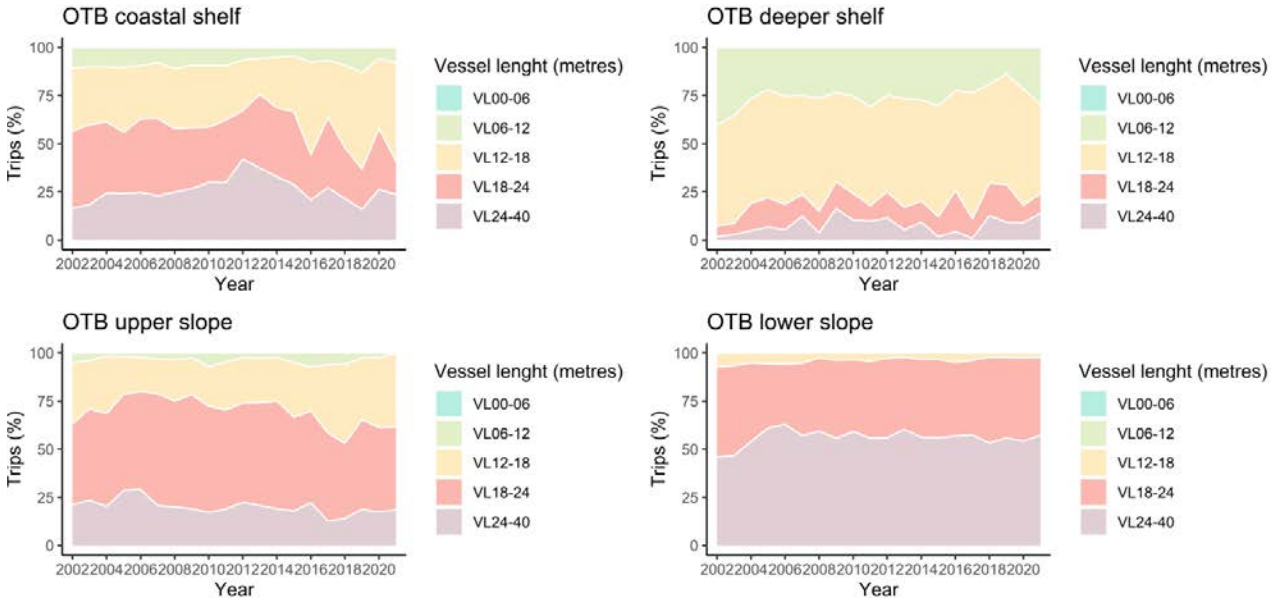


Figure 119. Vessel length (in meters) composition by métier for time series (2002-2021) for the OTB fleet in the Center zone.

Among the four OTBs, the fleet of blue and red shrimp (OTB4) in the central zone had a greater interannual stability. The number of vessels for the coastal *métier* (OTB1A) in the south zone decreased less than in the other cases.

Changes in Landing Per Unit Effort (LPUE)

Changes in Landing Per Unit Effort (LPUE) in each *métier* and their standard deviation for the time series (2002-2021) are shown in Figure 122. Continental shelf *métier*s (OTB1, OTB2, OTB1A, OTB1B, OTB2A and OTB2B) had a higher LPUE than upper and lower slope *métier*s (OTB3 and OTB4). There was no clear intrannual trend with fluctuations throughout the time series.

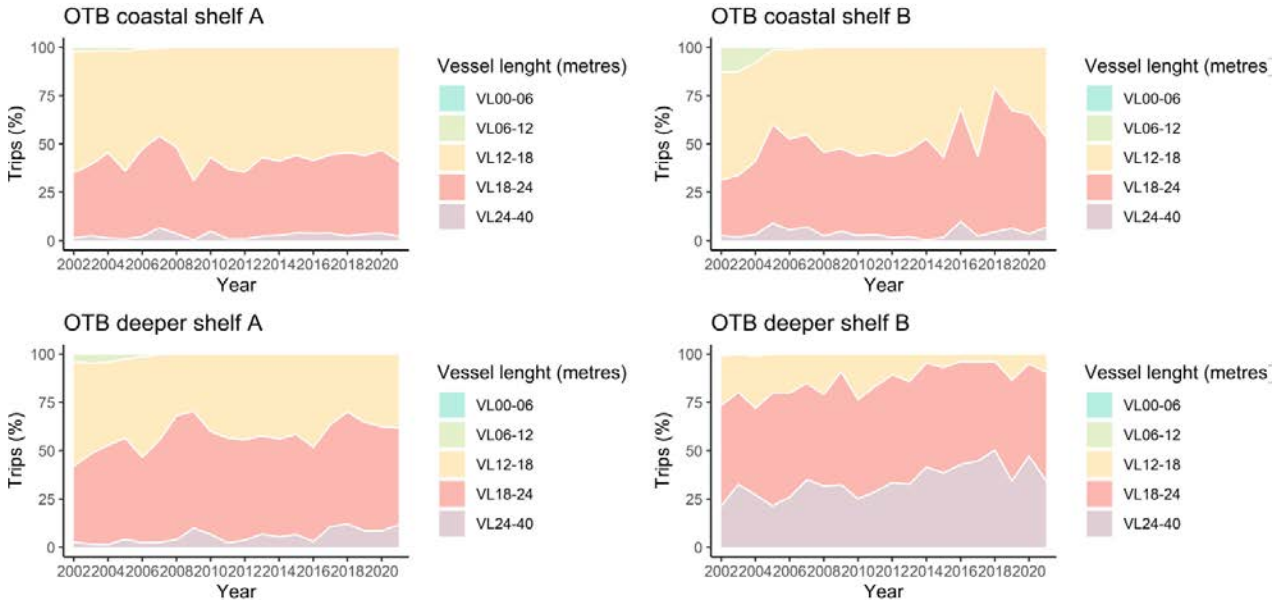


Figure 120. Vessel length (in meters) composition by métier for time series (2002-2021) for the OTB fleet in the South zone.

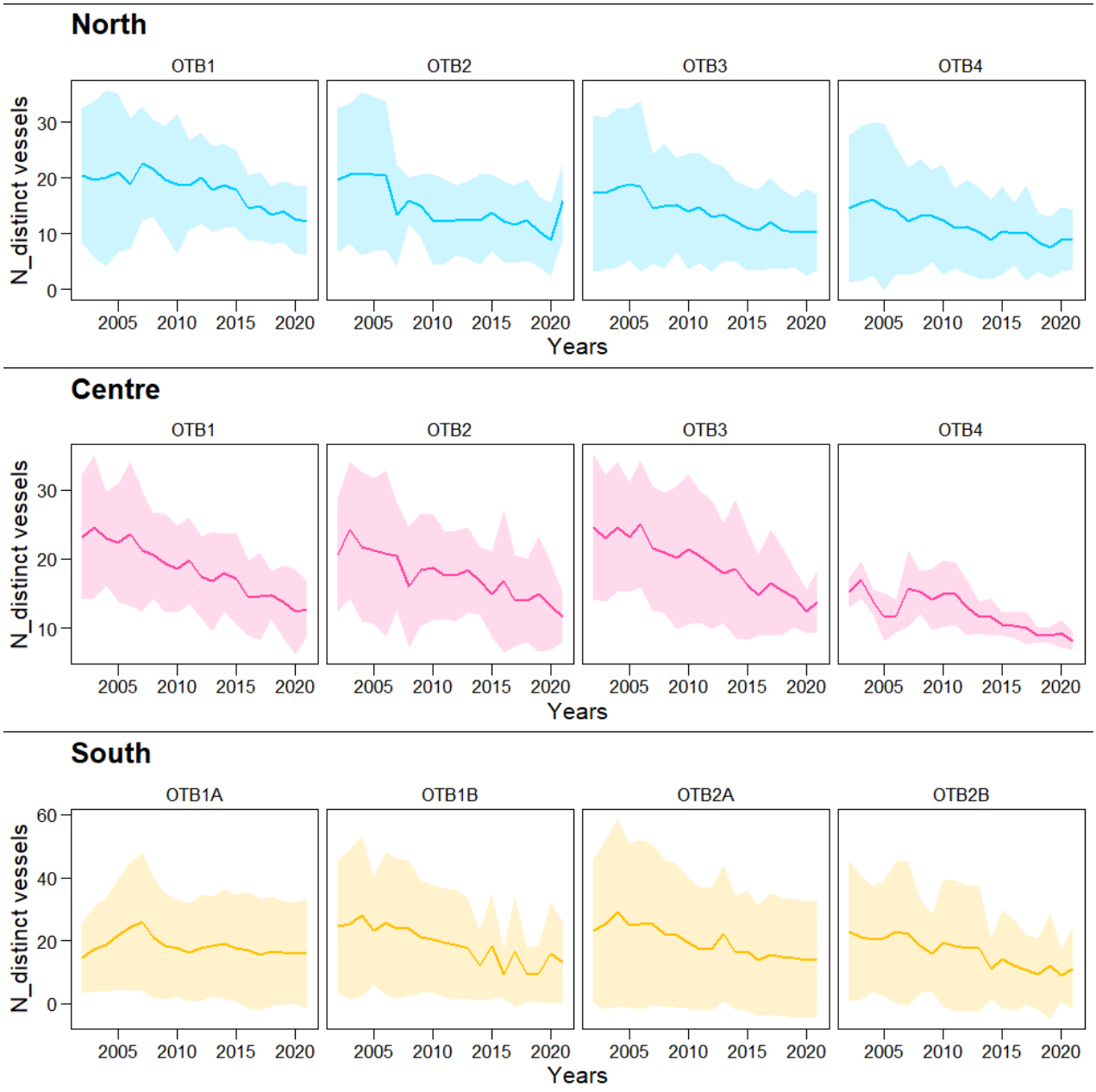


Figure 121. Mean number and standard deviation of different vessels fishing on each métier and by zone for the time series (2002 – 2021).

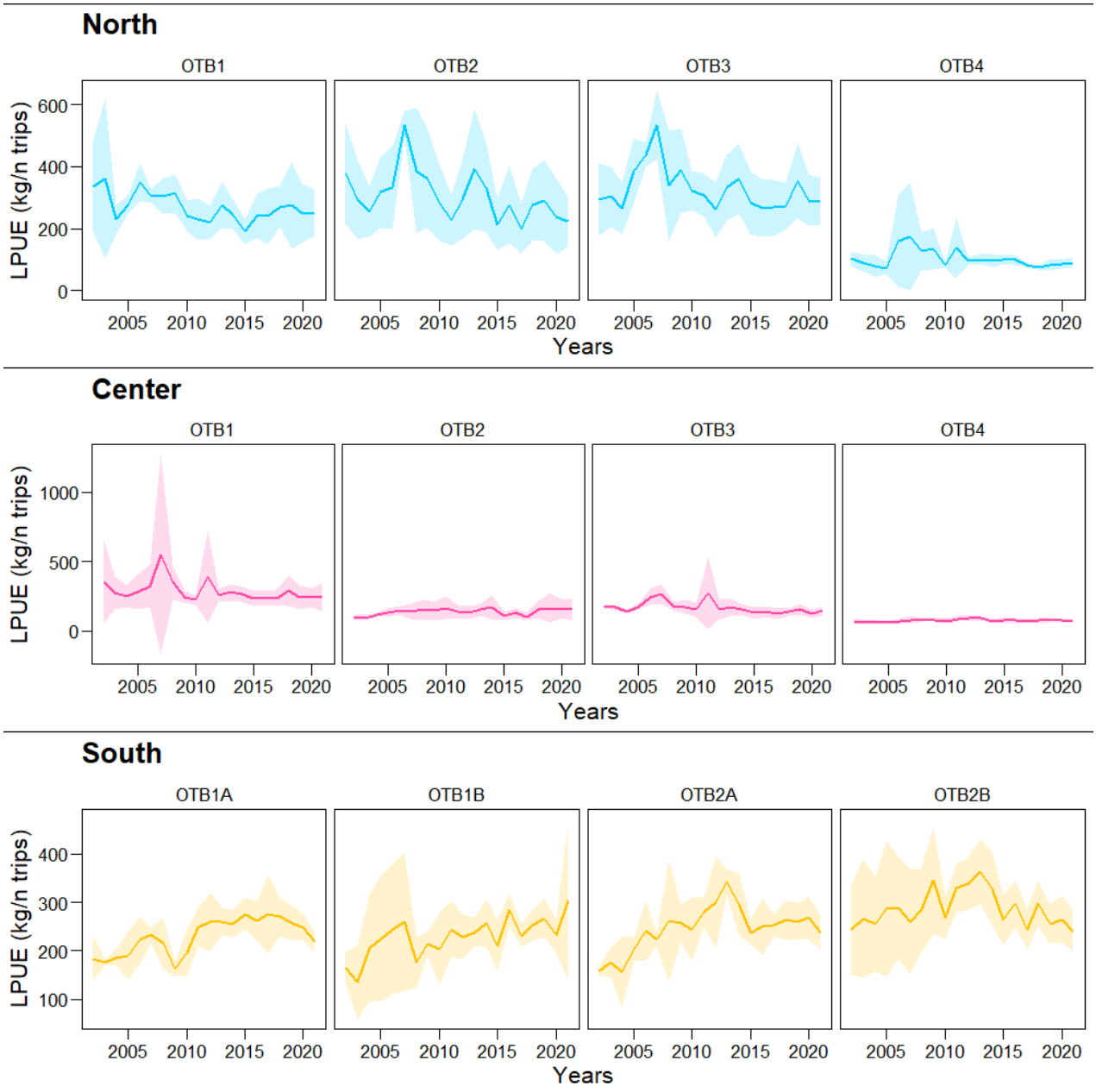


Figure 122. Changes in Landing Per Unit Effort (LPUE) in each métier and their standard deviation by zone for the time series (2002-2021).

Spatial differentiation using VMS data

VMS data was used to spatially differentiate the fishing ground of each *métier* at the port level (Fig. 123, Fig. *124,* Fig. 125, Fig. *126* and Fig. *127*). Trips (day + vessel) by *métier* for the years 2019 and 2020 were crossed with VMS data to represent the *métier*s distribution across the Catalan coast.

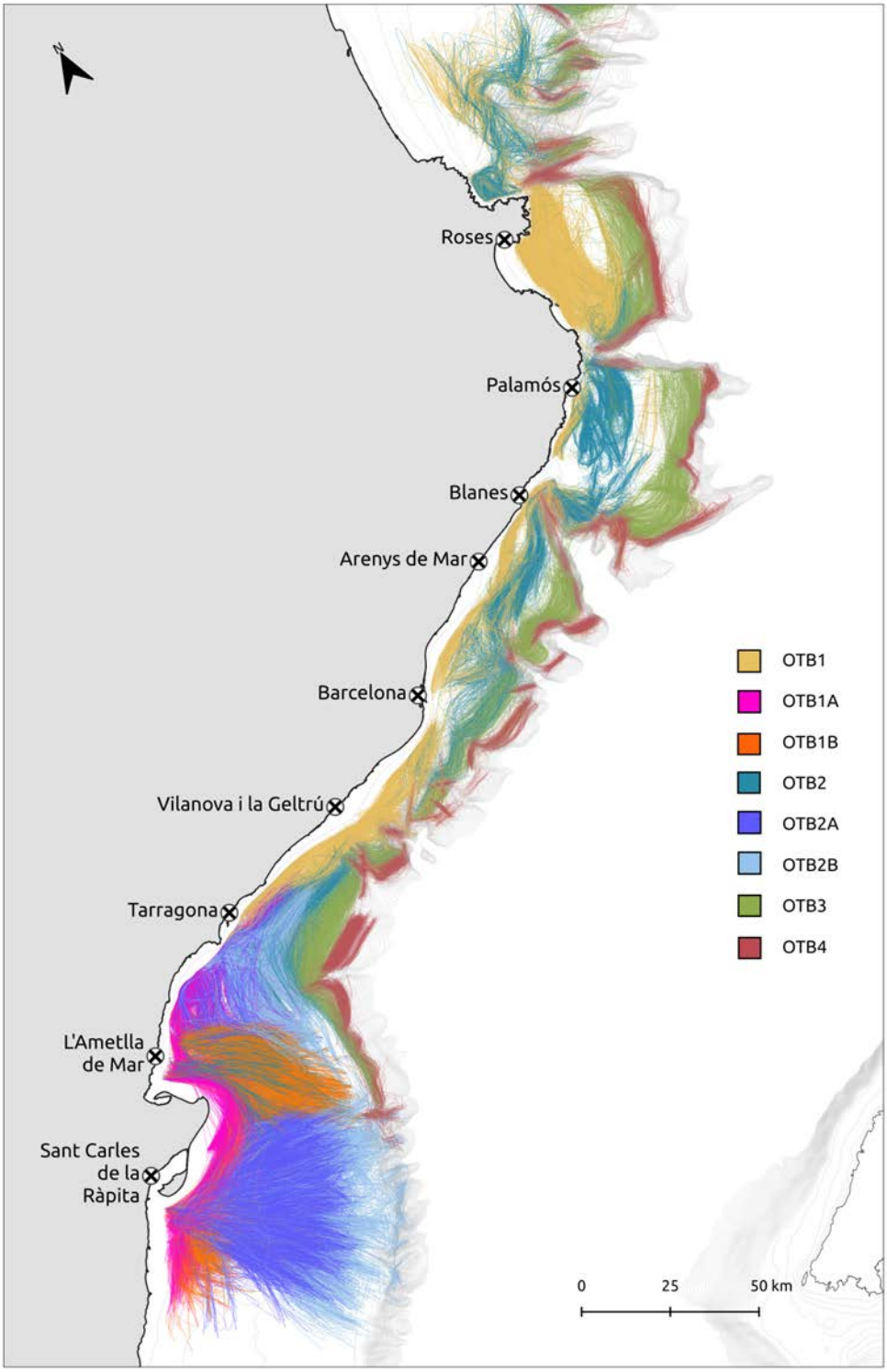


Figure 123. Spatial distribution of otter trawl fishery VMS, colours represents the different OTBs metiers identified for the catalan fishery.

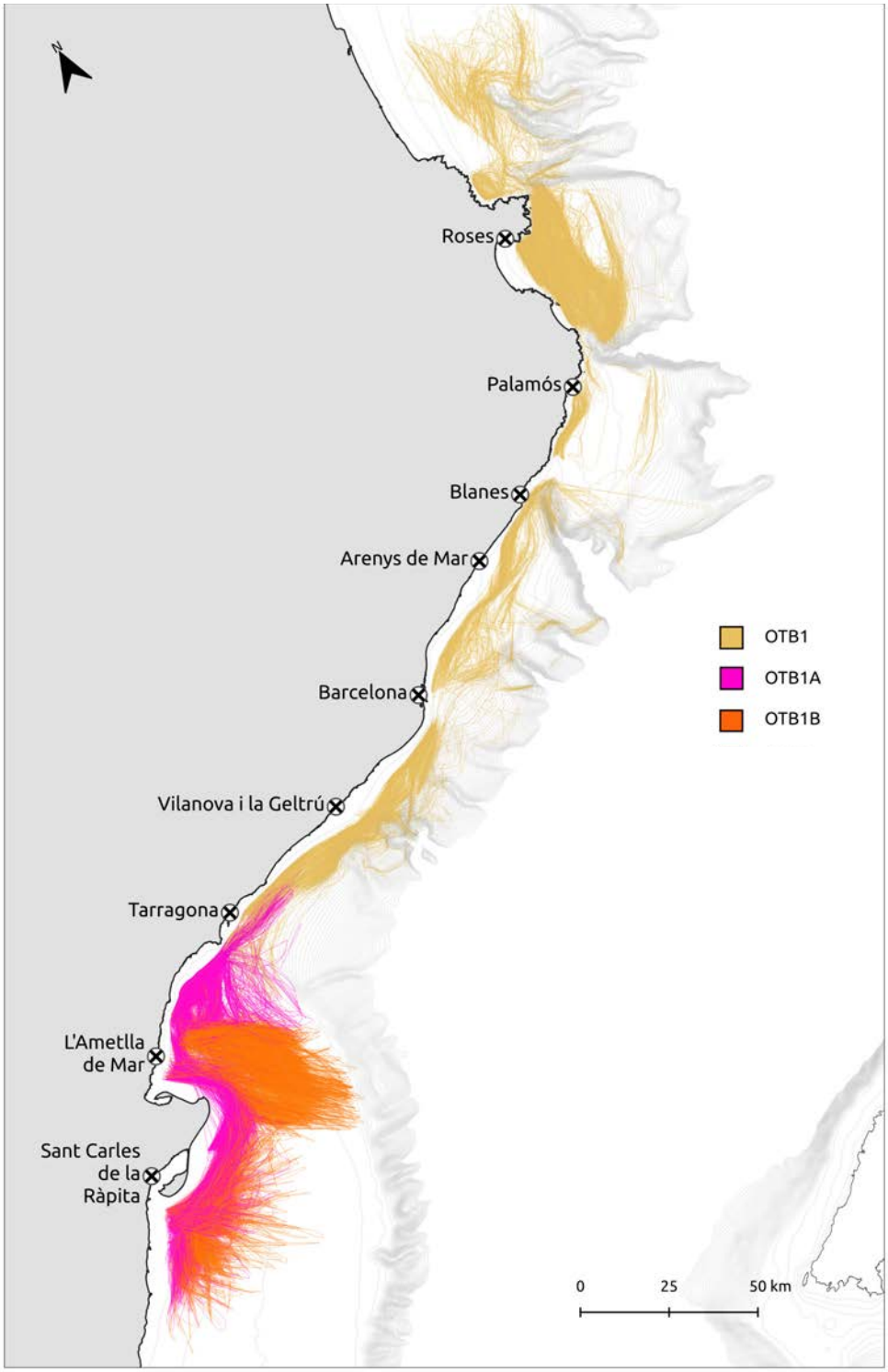


Figure 124. Spatial distribution of coastal shelf metiers trawl otter fishery VMS. Colours represent the different coastal shelf identified: OTB1; noth and center coast, OTB1A; south A and OTB1B; south B.

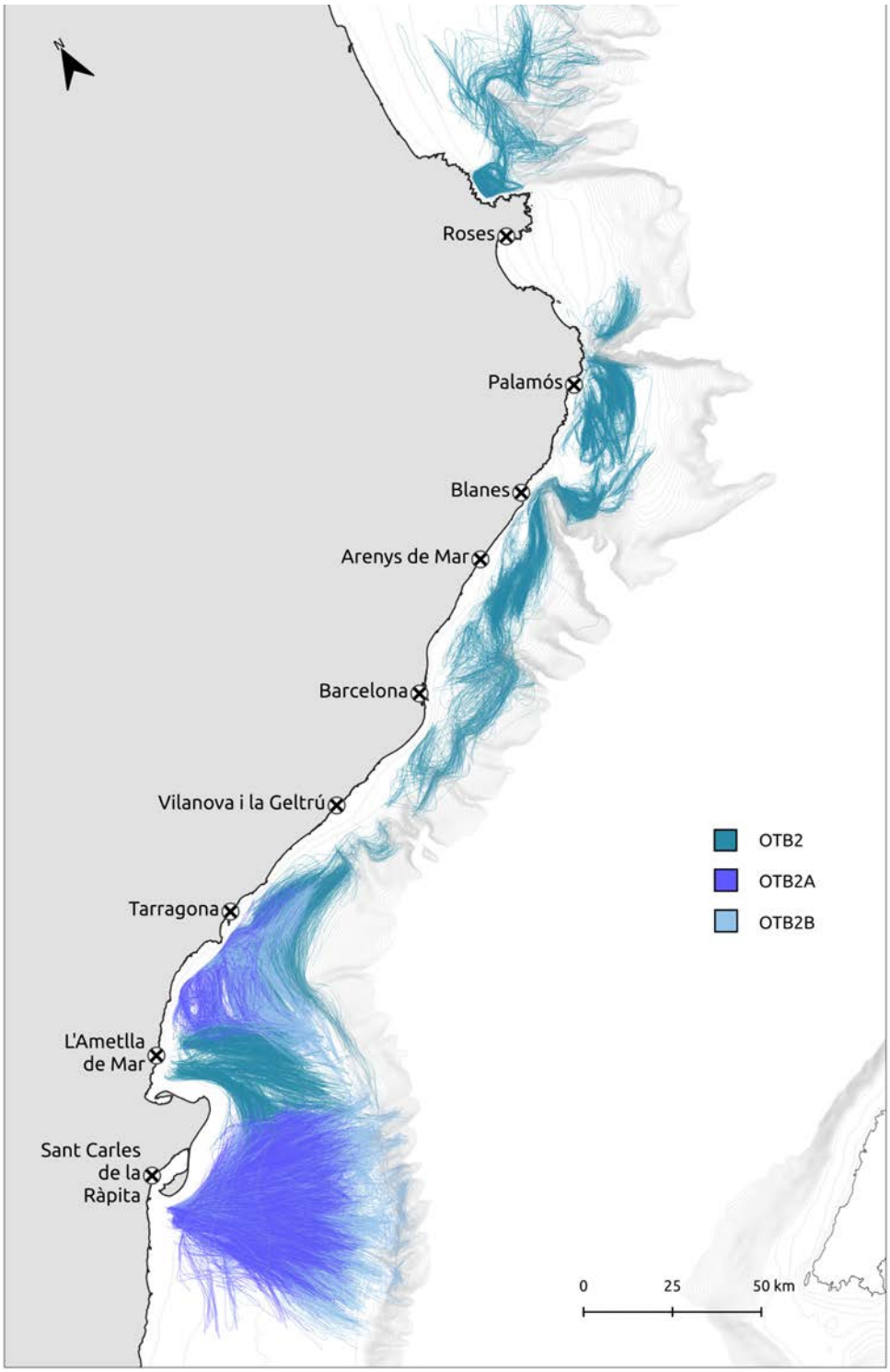


Figure 125. Spatial distribution of deeper shelf metiers trawl otter fishery VMS. Colours represents the different metiers identified: OTB2; north and central coast, OTB2A; south A and OTB2B; south B.

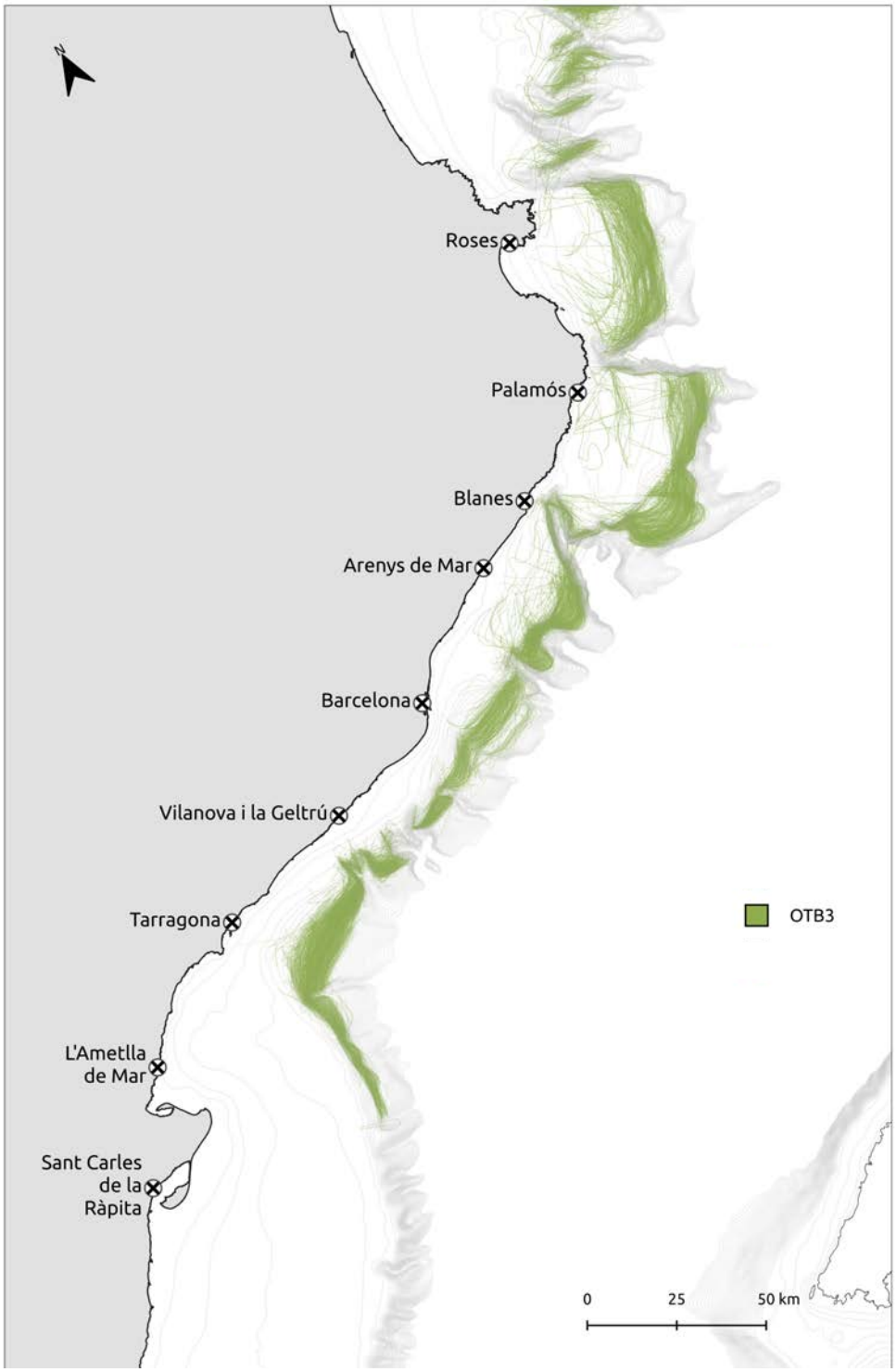


Figure 126. Spatial distribution of upper slope (north and central coast) metiers (OTB3) trawl otter fishery VMS.

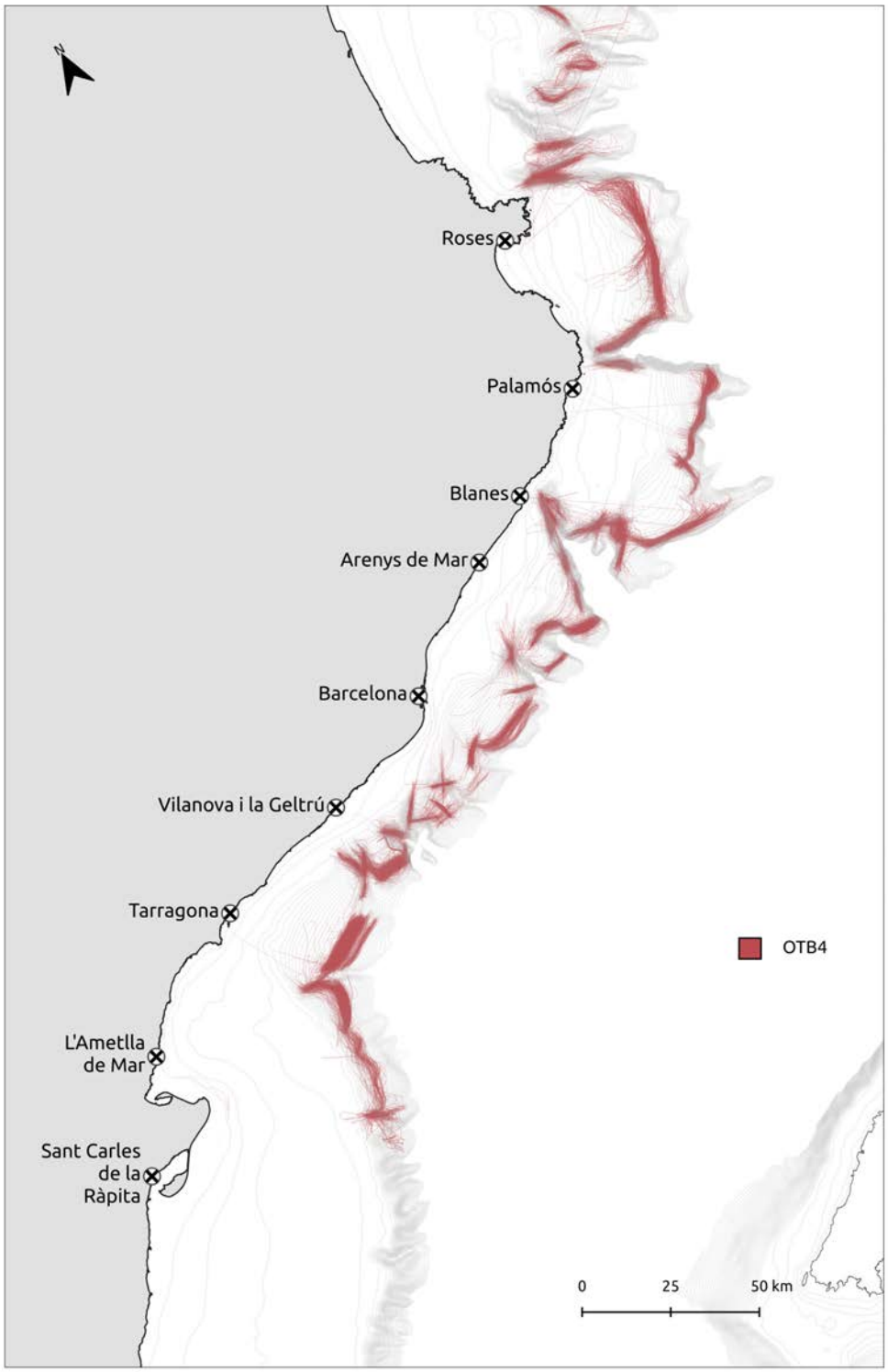


Figure 127. Spatial distribution of lower slope (north and central coast) metiers (OTB4) trawl otter fishery VMS.

Main results and next steps

After the characterization of the Catalan fishing fleet for the bottom-trawl fishery case study, six different *métier*s were identified. Moreover, no slope *métier*s were found in the south of Catalonia. Most of *métiers* changed along the time series. Similarly, the importance of the spatial distribution among *métier*s changed inter and intra zones. The contribution of the mullets. in OTB1 and the Norway lobster in OTB 3 increased. However, the hake in OTB 2 decreased, and the blue and red shrimp in OTB4 remained constant along the time series. Our findings provided additional support to implement Article 11 related to spatial closures and Article 7 related to fishing effort.

The next steps will be to calculate the contribution of each *métier* for each port, to explore how it changes along the coast and also intra-year (by month), and, finally, to conduct a Productivity and Susceptibility Analysis (PSA) to identify vulnerability among zones. Importantly, this study should be useful to provide management recommendations at a spatial level for each *métier*.

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ANNEXES

Annex 1
Catch composition for bottom trawling in 2019, 2020 and 2021

Table 15. Landed species with higher biomass for 2019. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Actinopterygii								
Alosa fallax	1.01	0.98	3.33	2.27				
Boops boops	1.63	1.15	2.47	1.87				
Citharus linguatula	8.40	2.11	3.97	0.72	0.01	0.01		
Conger conger	0.17	0.10	0.65	0.27	2.60	0.84	2.35	0.76
Eutrigla gurnardus	0.65	0.28	4.01	1.19	0.02	0.02		
Helicolenus dactylopterus			2.70	1.31	7.10	1.91	3.17	0.90
Lepidorhombus boscii			4.53	1.52	7.16	1.40	0.69	0.20
Lithognathus mormyrus	7.74	7.52						
Lophius budegassa	7.69	2.59	52.11	8.18	11.13	3.59	1.67	0.72
Lophius piscatorius	0.54	0.36	2.86	1.58	12.84	3.70	5.64	2.73
Merluccius merluccius	21.40	6.46	45.18	5.93	30.24	5.26	8.92	3.18
Micromesistius poutassou			1.44	0.98	23.87	7.04	9.28	4.02
Mullus barbatus	16.44	4.94	39.32	6.07	0.49	0.18	0.02	0.02
Mullus surmuletus	2.40	1.45	5.55	1.92	0.61	0.40	0.53	0.52
Pagellus acarne	7.03	4.20	0.06	0.04				
Pagellus erythrinus	26.33	11.26	1.45	0.49			0.11	0.10
Phycis blennoides	0.03	0.03	7.09	1.78	76.06	22.20	28.75	8.39
Scomber colias	9.19	3.64	2.32	1.49	0.04	0.03		
Scomber scombrus	4.58	1.30	1.36	0.62				
Scorpaena elongata	0.01	0.01	3.13	1.45	1.60	0.65	1.40	0.71
Sparus aurata	6.89	4.31						
Sphyraena sphyraena	24.36	11.13						
Trachurus mediterraneus	27.80	11.22	13.53	9.17				
Trachurus picturatus			16.07	11.16				
Trachurus trachurus	8.56	5.22	109.59	33.05	4.12	3.61	0.06	0.06
Trigla lyra			2.04	0.73	3.50	0.96	0.97	0.88
Trisopterus capelanus	9.33	3.66	27.82	4.86	0.11	0.05	0.08	0.05
Chondrichtys								
Galeus melastomus					2.09	1.34	7.88	2.86
Scyliorhinus canicula	0.12	0.12	14.85	11.34	12.89	6.29	2.69	1.51
Crustacea								
Aristeus antennatus					0.25	0.14	81.05	9.42
Liocarcinus depurator	3.69	1.53	4.45	2.25	0.25	0.13	0.00	0.00
Nephrops norvegicus	0.46	0.44	0.38	0.24	63.96	11.32	2.45	0.78
Parapenaeus longirostris	2.84	1.00	6.70	1.97	21.17	6.05	1.06	0.46
Squilla mantis	21.67	4.37	1.64	0.47				
Cephalopoda								
Alloteuthis spp.	4.03	0.79	2.73	1.01				
Eledone cirrhosa	7.22	2.94	21.43	2.96	18.21	4.90	1.13	0.71
Illex coindetii	8.68	3.32	23.51	3.04	1.46	0.28	0.42	0.20
Octopus vulgaris	2.85	1.73	6.35	1.98	0.11	0.11	0.40	0.39
Todarodes sagittatus			0.06	0.06	5.22	1.19	1.04	0.37
Other invertebrates								
Parastichopus regalis			4.55	2.28	0.12	0.09	0.04	0.04

Table 16. Landed species with higher abundance for 2019. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Actinopterygii								
Arnoglossus laterna	106.16	32.58	41.16	16.78				
Cepola macrophthalma	24.21	8.35	83.79	52.45				
Chelidonichthys cuculus	1.96	1.91	88.11	43.24				
Citharus linguatula	305.22	83.87	101.06	21.58	0.26	0.25		
Engraulis encrasicolus			104.01	48.40				
Eutrigla gurnardus	21.53	8.82	120.02	36.39	0.28	0.28		
Helicolenus dactylopterus			78.53	36.96	115.37	31.18	36.15	11.79
Lepidorhombus boscii			84.24	23.27	229.49	76.55	16.48	5.10
Lepidotrigla cavillone	48.43	24.62	111.13	31.89				
Lepidotrigla dieuzeidei	8.67	8.43	80.37	33.77				
Lophius budegassa	22.49	9.29	133.00	20.13	22.76	6.63	2.34	0.95
Merluccius merluccius	147.72	48.53	346.73	47.07	127.61	32.91	20.71	6.20
Micromesistius poutassou			43.19	27.66	231.82	67.33	105.06	48.84
Mullus barbatus	423.47	139.63	612.39	93.16	6.53	2.17	0.29	0.29
Pagellus erythrinus	338.65	159.34	13.93	4.98			0.52	0.45
Phycis blennoides	0.46	0.45	123.54	33.87	1 023.11	269.35	304.87	87.80
Sardina pilchardus	194.30	188.83	7.89	7.78				
Serranus hepatus	37.87	14.06	58.21	24.71				
Trachurus mediterraneus	293.54	105.01	253.47	159.57				
Trachurus picturatus			108.41	76.62				
Trachurus trachurus	121.15	86.71	2 233.85	641.28	14.97	13.13	0.59	0.58
Trigla lyra			78.24	30.39	106.39	31.52	11.69	10.76
Trisopterus capelanus	314.40	138.42	828.37	127.81	1.68	0.81	1.66	1.08
Chondrichtys								
Scyliorhinus canicula	0.70	0.68	105.65	89.68	70.43	36.19	14.34	8.25
Crustacea								
Aristeus antennatus					10.00	5.57	4 711.51	488.57
Liocarcinus depurator	528.32	194.37	569.83	238.78	20.93	10.23	0.32	0.32
Macropipus tuberculatus			21.21	11.22	172.30	45.94	10.47	5.09
Nephrops norvegicus	7.25	6.80	6.02	4.67	2 846.31	499.59	91.40	28.75
Parapenaeus longirostris	351.42	130.47	1 095.4	403.29	1 740.38	529.19	80.68	35.59
Pasiphaea multidentata					5.18	2.07	537.14	123.10
Penaeus kerathurus	386.11	173.08	0.18	0.18				
Plesionika edwardsii					92.56	89.28	58.15	55.81
Plesionika heterocarpus			50.14	49.48	117.49	77.07	13.14	7.32
Plesionika martia					90.80	26.96	131.23	29.02
Squilla mantis	831.30	129.12	76.00	27.11				
Cephalopoda								
Alloteuthis spp.	114.60	28.34	98.69	39.47				
Eledone cirrhosa	29.63	10.35	101.33	13.07	61.00	13.04	4.59	2.94
Illex coindetii	164.44	48.57	479.06	59.63	21.57	4.67	9.57	4.57
Sepia orbignyana	0.66	0.46	91.69	22.60	0.97	0.51		
Other invertebrates								
Bolinus brandaris	405.98	129.24	24.94	21.90				

Table 17. Discarded species with higher biomass for 2019. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Actinopterygii								
Arnoglossus laterna	2.11	0.57	1.46	0.47	0.01	0.01		
Boops boops	30.68	14.89	35.48	13.49	0.05	0.03		
Capros aper	0.07	0.05	3.71	1.48	0.59	0.44	0.03	0.02
Coelorinchus caelorhincus					2.44	1.35	2.03	1.15
Conger conger			0.27	0.19	1.77	0.63	0.55	0.25
Diplodus annularis	3.74	2.42						
Engraulis encrasicolus	37.45	26.49	19.87	8.80			<0.00	<0.00
Helicolenus dactylopterus			0.58	0.36	0.71	0.19	0.33	0.22
Hoplostethus mediterraneus					0.01	<0.00	1.69	1.41
Lampanyctus crocodilus					0.32	0.20	2.79	0.92
Lepidorhombus boscii			0.27	0.11	2.59	0.99	0.11	0.04
Lophius budegassa	1.06	0.53	3.49	1.07	0.55	0.20	0.04	0.02
Merluccius merluccius	1.90	0.73	5.76	1.00	0.06	0.03	0.09	0.07
Micromesistius poutassou			2.06	1.16	0.49	0.45	0.02	0.02
Mola mola							3.80	3.74
Pagellus bogaraveo			1.15	0.50	0.79	0.67	0.25	0.16
Phycis blennoides			0.46	0.19	1.26	0.27	0.21	0.06
Sardina pilchardus	16.53	7.83	1.72	1.05				
Sardinella aurita	20.42	9.08	0.03	0.02				
Spicara flexuosa	1.43	0.47	6.95	2.25	0.35	0.17	0.01	0.01
Spicara maena	2.32	1.27	1.72	0.66	0.16	0.11		
Sprattus sprattus	2.74	2.00	0.03	0.02				
Trachurus mediterraneus	11.20	6.41	5.78	2.89				
Trachurus picturatus			4.77	4.54	0.89	0.84		
Trachurus trachurus	5.55	4.61	22.39	17.39	1.14	0.53	0.10	0.10
Trachyrincus scabrus			0.01	0.01	0.51	0.20	2.09	0.91
Trisopterus capelanus	1.35	0.96	3.47	1.46	0.05	0.02		
Chondrichtys								
Galeus melastomus			0.01	0.01	4.78	1.07	5.37	1.17
Scyliorhinus canicula	<0.00	<0.00	55.09	17.18	41.51	11.84	8.30	6.19
Crustacea								
Dardanus arrosor	0.34	0.11	1.07	0.27	0.68	0.28	0.48	0.36
Liocarcinus depurator	5.03	2.71	4.31	2.76	0.05	0.02	<0.00	<0.00
Squilla mantis	5.29	1.10	0.50	0.17	<0.00	<0.00		
Cephalopoda								
Illex coindetii	0.11	0.05	1.63	0.61	0.56	0.16	0.18	0.07
Octopus salutii			0.44	0.31	4.20	2.24	0.02	0.02
Octopus vulgaris	2.02	1.07	1.63	0.66	0.14	0.14		
Other invertebrates								
Alcyonium palmatum	0.20	0.06	4.97	1.34	1.42	0.98	0.03	0.02
Calliactis parasitica	0.06	0.03	1.24	0.29	0.23	0.08	0.04	0.02
Astropecten irregularis	3.66	0.83	4.41	1.58	0.15	0.04	0.02	0.01
Echinus melo			6.65	3.83			1.31	1.18
Diazona violacea			3.42	1.44	0.04	0.03		

Table 18. Items from the debris fraction with higher mass for 2019. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Natural debris								
Codium bursa	0.44	0.21	0.31	0.18	0.17	0.16		
Codium tomentosum					<0.00	<0.00		
Marine organic debris	8.72	2.10	10.44	2.32	4.57	0.67	1.46	0.43
Marine plants	3.56	0.62	1.74	0.46	0.70	0.14	0.28	0.14
Other marine algae	0.03	0.02	0.09	0.08	0.08	0.06	<0.00	<0.00
Rhodophyta					<0.00	<0.00		
Shell	3.39	0.68	6.12	1.08	4.16	1.64	0.86	0.53
Terrestrial animals	0.05	0.03	<0.00	<0.00	0.04	0.04	0.05	0.04
Terrestrial plants	35.10	28.29	7.76	3.22	2.72	0.85	0.49	0.24
Marine litter								
Chalk debris	0.02	0.02	4.61	2.79	0.45	0.41	0.11	0.11
Cigarette stubs	<0.00	<0.00	<0.00	<0.00				
Coal	0.30	0.11	2.30	0.69	1.83	0.31	2.81	2.27
Fishing gear	0.03	0.02	0.69	0.62	0.11	0.06	0.15	0.07
Glass / Ceramics	0.60	0.53	0.01	0.01	0.54	0.22	0.02	0.02
Lumber	5.73	3.11	4.63	1.10	1.39	0.48	2.06	1.10
Metal	0.19	0.08	0.05	0.03	0.01	0.01	0.01	0.01
Plastic	1.94	0.68	2.62	0.60	2.55	0.55	1.73	0.70
Ropes	0.18	0.07	0.05	0.02	0.06	0.02	0.06	0.04
Textiles	0.04	0.04	0.78	0.36	0.68	0.28	0.07	0.04
Wet wipes			0.39	0.14	0.86	0.43	0.17	0.08
Unclassified debris			0.19	0.12	0.04	0.02	0.12	0.11

Table 19. Landed species with higher biomass for 2020. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Actinopterygii								
Centrolophus niger					3.92	2.64	0.23	0.17
Chelidonichthys lucerna	4.71	1.67	1.08	0.24				
Citharus linguatula	7.97	2.85	4.35	0.91	0.07	0.04		
Conger conger	1.24	0.28	0.58	0.23	1.64	0.33	2.84	1.03
Eutrigla gurnardus	0.30	0.24	3.26	1.05				
Helicolenus dactylopterus			0.11	0.05	5.55	2.08	0.42	0.17
Lepidorhombus boscii			3.49	0.81	7.85	1.57	0.45	0.14
Lophius budegassa	4.58	1.94	41.38	5.68	5.02	2.01	3.04	2.37
Lophius piscatorius			5.77	4.42	1.42	1.07	2.60	1.85
Merluccius merluccius	19.06	6.75	32.84	3.80	15.08	2.15	5.45	1.48
Micromesistius poutassou			0.01	0.01	37.39	16.96	4.63	1.20
Mugil cephalus	8.49	8.13						
Mullus barbatus	14.80	3.18	36.04	6.80	0.29	0.19	0.01	0.01
Mullus surmuletus	1.84	0.61	9.55	4.83	0.43	0.40	0.02	0.02
Pagellus erythrinus	19.45	11.81	7.12	2.84	0.14	0.11		
Phycis blennoides			3.08	1.32	79.89	40.60	20.92	4.26
Scomber scombrus	9.38	2.84	5.84	4.26				
Sparus aurata	23.44	18.61						
Sphyraena sphyraena	14.75	7.67						
Trachinus draco	2.40	0.74	4.07	1.23				
Trachurus mediterraneus	25.63	7.89	0.45	0.34				
Trachurus trachurus	4.03	2.31	82.21	25.87	0.98	0.68	0.11	0.11
Trigla lyra			0.90	0.44	2.85	0.87		
Trisopterus capelanus	6.29	2.06	18.36	3.65	0.02	0.02		
Chondrichtys								
Galeus melastomus					0.23	0.22	7.34	3.30
Scyliorhinus canicula			8.86	5.44	23.12	9.27	2.85	1.83
Crustacea								
Aristeus antennatus					0.35	0.22	74.97	6.38
Liocarcinus depurator	10.68	8.19	3.01	2.02	0.04	0.04		
Nephrops norvegicus	0.44	0.20	0.35	0.23	46.71	6.88	3.18	0.87
Parapenaeus longirostris	7.13	2.42	13.14	3.42	33.03	7.34	1.10	0.48
Paromola cuvieri					0.33	0.33	3.71	2.61
Pasiphaea multidentata					0.03	0.02	5.07	1.14
Squilla mantis	26.86	7.28	3.08	1.57				
Cephalopoda								
Alloteuthis spp.	5.90	1.39	0.75	0.29			0.10	0.10
Eledone cirrhosa	12.39	3.44	20.03	3.61	10.29	3.20	1.65	0.70
Illex coindetii	6.72	2.81	28.52	8.32	4.90	1.59	0.31	0.23
Octopus vulgaris	4.53	2.79	2.49	0.93	0.21	0.21		
Sepia officinalis	5.81	2.63	0.24	0.24				
Todarodes sagittatus					1.69	0.46	1.76	0.75
Other invertebrates								
Parastichopus regalis	0.24	0.23	8.47	3.32				

Table 20. Landed species with higher abundance for 2020. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Actinopterygii								
Argentina sphyraena			104.92	79.01	5.03	2.50		
Arnoglossus laterna	136.48	52.28	52.45	20.07				
Cepola macrophthalma	24.84	12.81	52.60	26.38	0.69	0.49		
Citharus linguatula	316.35	99.98	127.27	25.96	1.43	0.73		
Eutrigla gurnardus	13.20	10.19	96.90	37.75				
Helicolenus dactylopterus			3.63	1.80	92.80	33.37	3.27	1.17
Lepidorhombus boscii			67.64	17.09	189.32	41.88	7.19	1.45
Lepidotrigla cavillone	34.24	11.27	119.37	47.21				
Lophius budegassa	7.13	2.70	100.66	14.96	9.79	3.28	1.82	0.89
Merluccius merluccius	206.25	74.95	275.73	48.69	57.89	9.36	11.26	2.98
Micromesistius poutassou			0.21	0.21	366.10	135.48	38.57	9.12
Mullus barbatus	326.00	90.12	695.00	136.04	4.38	3.02	0.09	0.09
Mullus surmuletus	32.06	8.60	115.06	64.90	2.72	2.42	0.20	0.19
Pagellus erythrinus	230.48	137.60	83.65	31.75	1.49	1.23		
Phycis blennoides			63.48	32.73	631.81	111.36	179.33	34.68
Scomber scombrus	96.12	29.89	88.41	70.56				
Serranus hepatus	27.45	11.50	138.74	93.13				
Sparus aurata	169.98	137.70						
Trachinus draco	46.79	14.49	50.00	14.32				
Trachurus mediterraneus	357.84	124.11	10.32	9.01				
Trachurus trachurus	91.80	51.05	2 022.27	631.62	7.00	4.79	0.44	0.43
Trigla lyra			34.76	22.12	88.25	32.17		
Trisopterus capelanus	196.90	54.65	622.56	121.91	0.46	0.45		
Chondrichtys								
Scyliorhinus canicula			46.25	27.69	130.16	52.98	12.95	8.36
Crustacea								
Aristeus antennatus					14.43	8.56	3 909.95	358.38
Liocarcinus depurator	1221.37	966.75	288.86	198.04	2.74	2.21		
Nephrops norvegicus	4.58	1.96	6.92	4.66	2 035.42	323.34	123.28	47.49
Parapenaeus longirostris	1082.79	423.05	1794.09	467.36	3 160.02	841.12	80.85	36.18
Pasiphaea multidentata					4.17	2.93	741.27	153.42
Penaeus kerathurus	220.97	131.10						
Plesionika heterocarpus			5.04	4.95	93.80	46.13	1.93	1.28
Plesionika martia					88.78	56.82	249.37	52.61
Squilla mantis	869.31	216.06	120.62	66.61				
Cephalopoda								
Alloteuthis spp.	160.87	36.85	20.54	8.31			0.21	0.20
Eledone cirrhosa	48.19	13.88	121.49	24.41	46.95	16.25	5.04	2.37
Illex coindetii	275.13	148.53	826.09	223.94	100.71	49.87	2.38	1.32
Sepia elegans	58.44	35.02	39.18	16.46	0.28	0.27		
Sepia orbignyana	0.48	0.46	92.71	25.45	4.24	2.05		
Other invertebrates								
Parastichopus regalis	1.81	1.73	68.18	26.73				
Bolinus brandaris	171.80	42.26	1.27	0.59				

Table 21. Discarded species with higher biomass for 2020. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Actinopterygii								
Argentina sphyraena			2.06	1.90	0.01	0.01		
Arnoglossus laterna	2.50	0.87	1.15	0.53	0.01	0.01	0.01	0.01
Boops boops	9.10	3.85	44.59	16.17	0.13	0.12		
Capros aper	0.02	0.01	10.48	7.64	0.70	0.36	<0.00	<0.00
Conger conger			0.34	0.28	2.27	1.14	0.86	0.31
Engraulis encrasicolus	36.57	24.28	8.52	5.46				
Gadiculus argenteus			0.06	0.06	2.87	1.39	0.05	0.03
Lophius budegassa			4.91	2.38	0.51	0.21		
Macroramphosus scolopax			16.08	15.53	0.01	0.01		
Merluccius merluccius	7.92	3.30	10.62	1.92	0.36	0.10	0.06	0.06
Mola mola			6.24	5.58				
Pagellus acarne	13.68	12.04	0.09	0.07				
Pagellus bogaraveo			5.31	3.47	0.39	0.26	0.12	0.12
Phycis blennoides			0.65	0.61	1.75	0.54	0.49	0.17
Sardina pilchardus	17.09	8.73	0.27	0.13	0.01	0.01		
Sardinella aurita	42.59	28.70						
Spicara flexuosa	10.78	5.93	14.06	4.99	0.13	0.10		
Spicara maena	4.47	2.21	7.08	4.94			0.01	0.01
Trachurus mediterraneus	9.23	3.04			<0.00	<0.00		
Trachurus trachurus	5.65	3.88	15.23	3.93	1.16	0.89	0.14	0.12
Trachyrincus scabrus					0.02	0.01	2.27	0.85
Trisopterus capelanus	1.52	0.93	2.51	1.40	0.03	0.03		
Chondrichtys								
Etmopterus spinax					0.13	0.04	2.26	1.29
Galeus melastomus					3.65	1.47	19.63	7.90
Raja spp.			3.31	3.23	0.01	0.01		
Scyliorhinus canicula			30.58	7.83	49.86	13.32	11.53	3.60
Crustacea								
Dardanus arrosor	0.58	0.24	1.48	0.60	0.46	0.15	0.04	0.02
Parapenaeus longirostris	0.54	0.26	1.36	0.50	0.52	0.13	0.02	0.01
Plesionika heterocarpus			19.17	18.72	0.57	0.23	<0.00	<0.00
Squilla mantis	4.38	2.24	0.36	0.24				
Cephalopoda								
Histioteuthis bonnellii					0.24	0.22	2.13	1.09
Illex coindetii	0.40	0.24	1.95	0.35	0.57	0.16	0.32	0.14
Octopus salutii	0.19	0.18	0.40	0.40	1.80	1.03	0.30	0.20
Octopus vulgaris	3.31	1.53	0.59	0.30				
Other invertebrates								
Alcyonium palmatum	0.50	0.21	4.17	1.44	0.43	0.17	0.06	0.04
Astropecten irregularis	4.06	1.70	2.91	1.14	0.09	0.03	0.02	0.01
Echinus melo			14.23	8.90			<0.00	<0.00
Gracilechinus acutus			6.54	6.42				
Leptometra phalangium			60.41	50.54	0.03	0.03		
Neopycnodonte cochlear			2.27	1.57	0.16	0.12	<0.00	<0.00

Table 22. Items from the debris fraction with higher mass for 2020. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Natural debris								
Codium bursa	3.77	3.07	1.29	0.69	0.05	0.05		
Codium tomentosum	0.04	0.03						
Marine organic debris	13.27	3.34	7.03	1.12	7.79	4.36	1.72	0.42
Marine plants	20.11	10.43	3.57	1.33	0.60	0.23	0.37	0.15
Other marine algae	0.08	0.05	0.03	0.02	0.03	0.02	0.01	0.01
Rhodophyta	<0.00	<0.00	0.02	0.02				
Shells	11.09	2.49	5.90	1.17	3.37	1.65	0.34	0.16
Terrestrial plants	11.55	2.27	17.73	3.67	11.95	3.55	3.07	0.97
Marine litter								
Chalk debris	0.44	0.42	0.48	0.27	0.11	0.07	0.05	0.03
Cigarette stubs					0.01	0.01		
Coal	1.59	0.66	5.02	3.01	2.43	0.60	1.08	0.47
Fishing gear	3.51	3.35	0.10	0.05	0.06	0.04	0.14	0.11
Glass / Ceramics	1.83	1.75	0.47	0.46	0.70	0.57	0.12	0.08
Lumber	0.67	0.47	3.37	1.12	0.93	0.89	0.18	0.10
Metal			0.80	0.45	0.14	0.10	0.03	0.03
Plastic	0.72	0.24	6.13	2.39	2.43	0.88	0.66	0.17
Ropes	0.14	0.08	0.26	0.19	0.06	0.03	0.05	0.02
Rubber			0.11	0.10	0.41	0.35	0.01	0.01
Textiles	0.01	0.01	1.13	1.08	0.22	0.09	1.16	0.92
Wet wipes	0.07	0.05	10.80	6.57	2.46	1.00	2.82	1.46
Unclassified debris	0.03	0.03	0.13	0.08	0.08	0.04	0.05	0.04

Table 23. Landed species with higher biomass for 2021. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Actinopterygii								
Boops boops	11.01	5.45	2.77	1.81				
Citharus linguatula	7.74	2.92	3.58	0.69				
Conger conger	1.40	0.40	0.23	0.10	2.78	0.72	1.44	0.29
Helicolenus dactylopterus			2.19	1.33	13.49	3.78	2.24	1.32
Lepidorhombus boscii			2.73	0.93	8.35	1.46	1.00	0.51
Lithognathus mormyrus	8.14	4.85						
Lophius budegassa	4.44	3.58	29.04	5.63	9.87	3.23	1.77	1.38
Lophius piscatorius	2.56	2.30	0.80	0.56	8.00	5.11	5.46	2.76
Merluccius merluccius	17.28	4.30	44.96	6.39	15.18	2.16	7.03	1.46
Micromesistius poutassou			0.24	0.13	25.08	5.33	2.45	0.54
Mullus barbatus	15.73	6.84	47.44	12.27	0.65	0.43		
Mullus surmuletus	4.55	1.53	7.30	3.50	0.70	0.26		
Pagellus erythrinus	19.46	10.31	3.17	1.39			0.04	0.03
Phycis blennoides	0.03	0.02	5.33	1.82	67.77	19.89	28.20	4.33
Scomber scombrus	12.00	5.68	4.39	1.32				
Scorpaena elongata	0.10	0.04	4.00	2.42	1.06	0.50	0.65	0.37
Sphyraena sphyraena	6.20	5.97						
Trachinus draco	1.45	0.59	3.22	0.95				
Trachurus mediterraneus	5.42	2.39	7.09	6.51			0.03	0.02
Trachurus trachurus	19.68	6.22	60.17	25.30	2.16	0.93		
Trigla lyra			0.94	0.37	2.48	0.77	0.58	0.40
Trisopterus capelanus	7.08	2.42	9.56	2.08				
Chondrichtys								
Galeus melastomus					0.35	0.24	24.91	8.03
Raja spp.	1.74	0.92	1.56	1.10	0.01	0.01		
Scyliorhinus canicula			2.86	1.82	5.39	3.04	0.11	0.11
Crustacea								
Aristeus antennatus							63.22	9.49
Geryon longipes							3.19	0.94
Liocarcinus depurator	8.29	4.70	4.08	2.52	0.01	0.01		
Nephrops norvegicus	0.47	0.30	0.39	0.12	35.20	5.67	3.05	1.95
Parapenaeus longirostris	8.18	2.67	22.47	6.60	31.35	6.95	3.64	2.21
Penaeus kerathurus	6.00	2.42						
Squilla mantis	30.10	4.79	2.67	1.12				
Cephalopoda								
Alloteuthis spp.	5.19	1.66	0.52	0.31				
Eledone cirrhosa	6.24	2.30	16.82	2.67	14.24	4.10	1.87	0.73
Illex coindetii	14.75	5.01	43.19	8.98	7.53	2.44	1.21	0.69
Loligo vulgaris	3.57	1.14	1.35	0.52				
Octopus vulgaris	7.53	4.04	2.10	0.72				
Sepia officinalis	6.32	2.30	0.42	0.31				
Todarodes sagittatus			0.09	0.08	2.48	0.44	2.37	0.62
Other invertebrates								
Parastichopus regalis	0.12	0.08	5.37	2.91				

Table 24. Landed species with higher abundance for 2021. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Actinopterygii								
Argentina sphyraena			89.82	45.07	4.44	2.29	0.17	0.16
Arnoglossus laterna	87.52	28.81	40.66	14.69				
Boops boops	192.07	91.79	43.67	29.07				
Citharus linguatula	243.90	88.07	114.23	25.33				
Engraulis encrasicolus			110.36	91.68				
Eutrigla gurnardus	84.56	40.51	86.58	49.87				
Helicolenus dactylopterus			53.14	25.59	178.85	43.71	29.87	18.33
Lepidorhombus boscii			47.13	12.74	191.45	36.68	16.30	8.80
Lepidotrigla cavillone	53.78	36.04	115.21	44.06				
Lophius budegassa	17.38	14.72	75.40	14.79	17.02	4.62	0.95	0.46
Merluccius merluccius	224.16	75.13	549.86	115.26	87.84	13.73	19.74	5.09
Micromesistius poutassou			3.48	1.56	256.82	59.04	19.70	5.22
Mullus barbatus	407.63	229.64	828.09	223.15	9.84	6.45		
Mullus surmuletus	56.83	18.52	98.66	51.40	4.01	1.59		
Pagellus erythrinus	244.69	125.54	35.60	15.27			0.46	0.45
Phycis blennoides	0.70	0.67	77.93	20.20	909.25	157.06	250.77	41.84
Sardina pilchardus	230.91	208.93	10.33	7.56				
Scomber scombrus	121.74	62.08	35.24	10.51				
Serranus hepatus	29.46	11.76	51.49	17.84				
Trachurus mediterraneus	79.52	38.25	156.15	135.59			0.21	0.21
Trachurus trachurus	291.92	81.16	1 183.9	468.19	17.74	7.19		
Trigla lyra			30.55	8.81	60.27	17.33	7.18	4.72
Trisopterus capelanus	252.37	92.81	352.89	82.91				
Crustacea								
Aristeus antennatus							3 697.78	533.99
Liocarcinus depurator	934.05	584.18	445.53	290.70	0.69	0.68		
Macropipus tuberculatus			2.90	2.47	99.72	52.98		
Nephrops norvegicus	4.64	3.31	5.16	1.82	1 653.17	310.07	112.05	76.56
Parapenaeus longirostris	910.22	247.15	2 687.74	755.25	2 743.05	673.46	231.48	121.56
Pasiphaea multidentata					4.63	3.06	352.21	80.52
Penaeus kerathurus	263.34	111.29						
Plesionika edwardsii					128.19	125.80		
Plesionika heterocarpus			107.06	105.48	48.29	27.51	2.99	2.93
Plesionika martia					106.06	60.10	307.54	53.57
Squilla mantis	1 042.57	175.23	90.47	37.90				
Cephalopoda								
Alloteuthis spp.	178.05	64.39	16.22	9.32				
Eledone cirrhosa	26.61	8.59	76.17	10.14	50.39	13.73	5.31	2.06
Illex coindetii	336.54	145.42	1 293.1	459.81	108.75	25.83	14.05	5.85
Sepia elegans	63.58	35.67	45.50	16.98				
Sepia orbignyana			53.58	12.55	4.57	2.60		
Other invertebrates								
Bolinus brandaris	248.42	63.49	4.56	1.89				

Table 25. Discarded species with higher biomass for 2021. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Actinopterygii								
Arnoglossus laterna	2.06	0.58	0.96	0.26	0.02	0.01	<0.00	<0.00
Boops boops	6.83	2.06	25.56	7.97	0.10	0.10	0.14	0.10
Capros aper			8.63	5.97	0.79	0.41	0.04	0.04
Coelorinchus caelorhincus					5.24	1.57	3.00	1.50
Conger conger			0.17	0.11	2.22	1.19	1.51	0.63
Engraulis encrasicolus	71.70	67.88	4.09	1.26	0.03	0.02	0.01	0.01
Gadiculus argenteus			0.16	0.11	2.04	0.49	0.13	0.06
Lampanyctus crocodilus					0.71	0.60	4.74	1.77
Lophius budegassa	1.42	0.76	11.69	2.74	0.82	0.23	0.26	0.21
Macroramphosus scolopax			2.06	1.15	0.02	0.01	0.01	0.01
Merluccius merluccius	8.31	5.51	23.75	8.34	0.61	0.28	0.08	0.06
Pagellus acarne	5.40	2.80	0.01	0.01				
Pagellus bogaraveo	0.26	0.21	3.74	2.13	1.92	0.86	1.02	1.00
Pagellus erythrinus	2.08	1.15	1.23	0.74	0.05	0.04		
Phycis blennoides			0.56	0.21	1.83	0.52	0.85	0.19
Sardina pilchardus	67.14	57.65	2.42	0.92			0.04	0.04
Sardinella aurita	31.67	17.05	0.72	0.57				
Spicara flexuosa	2.83	1.64	20.40	5.28	0.01	0.01	0.02	0.02
Spicara maena	1.57	1.13	2.81	1.14	0.15	0.09		
Trachurus trachurus	0.86	0.44	7.76	2.52	1.77	0.92	0.18	0.12
Trisopterus capelanus	1.15	0.59	2.20	0.59	<0.00	<0.00		
Chondrichtys								
Etmopterus spinax					0.11	0.06	2.32	1.08
Galeus melastomus			0.09	0.06	2.16	1.07	11.11	5.25
Raja clavata			7.66	7.55	0.02	0.02		
Scyliorhinus canicula	0.15	0.15	41.86	18.70	58.99	13.52	22.53	10.73
Crustacea								
Liocarcinus depurator	3.05	2.14	1.83	1.18	0.04	0.02	0.02	0.01
Parapenaeus longirostris	0.58	0.30	1.59	0.53	0.43	0.11	0.19	0.13
Squilla mantis	3.66	1.13	0.86	0.64				
Cephalopoda								
Histioteuthis bonnellii					1.73	1.68	0.47	0.20
Illex coindetii	0.42	0.07	3.36	1.29	0.55	0.18	0.82	0.29
Octopus salutii			0.03	0.03	1.38	0.58	0.67	0.55
Octopus vulgaris	1.47	0.62	1.91	0.69	0.04	0.04		
Other invertebrates								
Alcyonium palmatum	0.57	0.16	19.09	8.24	0.29	0.09	0.33	0.27
Astropecten irregularis	8.35	2.67	4.76	2.45	0.09	0.02	0.03	0.03
Cidaris cidaris			1.52	0.98	0.97	0.96		
Echinus melo			10.00	5.63				
Leptometra phalangium			54.19	46.40	0.03	0.02	<0.00	<0.00
Spatangus purpureus			6.04	5.95				
Diazona violacea	0.01	0.01	2.47	1.23	0.06	0.05	0.03	0.03
Salpa spp.	1.30	1.22	1.02	0.50	0.06	0.05	0.07	0.03

Table 26. Items from the debris fraction with higher mass for 2021. SE: standard error.

	Shallow continental shelf		Continental shelf		Upper slope		Lower slope	
	mean	SE	mean	SE	mean	SE	mean	SE
Natural debris								
Codium bursa	0.02	0.02	0.06	0.03				
Marine organic debris	8.14	2.00	8.53	1.77	3.39	0.91	1.63	0.32
Marine plants	6.22	1.99	2.11	0.56	0.29	0.08	0.19	0.08
Other marine algae	0.08	0.07	0.03	0.02			<0.00	<0.00
Rhodophyta			<0.00	<0.00	<0.00	<0.00		
Shells	3.89	0.87	4.91	1.03	1.72	0.58	0.47	0.14
Terrestrial plants	9.61	2.36	11.05	3.00	10.02	5.65	6.83	4.25
Marine litter								
Chalk debris	0.08	0.05	4.35	4.20	0.02	0.01	0.23	0.23
Coal	0.52	0.35	2.01	0.64	1.79	0.40	1.82	0.79
Fishing gear	0.02	0.01	0.20	0.11	0.07	0.04	0.04	0.02
Glass / Ceramics	0.70	0.67	0.06	0.06	0.09	0.05	0.15	0.10
Lumber	1.24	0.66	1.86	0.89	0.72	0.39	0.67	0.38
Metal	0.03	0.03	0.25	0.13	0.03	0.02	0.05	0.03
Plastic	2.07	0.72	7.08	2.84	0.88	0.16	1.38	0.79
Ropes	0.05	0.04	0.10	0.04	0.05	0.02	0.04	0.02
Rubber			0.02	0.01				
Textiles	0.18	0.17	0.56	0.26	0.13	0.05	0.24	0.13
Wet wipes	0.23	0.14	4.95	2.22	1.20	0.57	0.75	0.41
Unclassified debris	7.56	7.28			0.08	0.07	<0.00	<0.00

Annex 2

Statistical analysis results for bottom trawling *métier*s by port

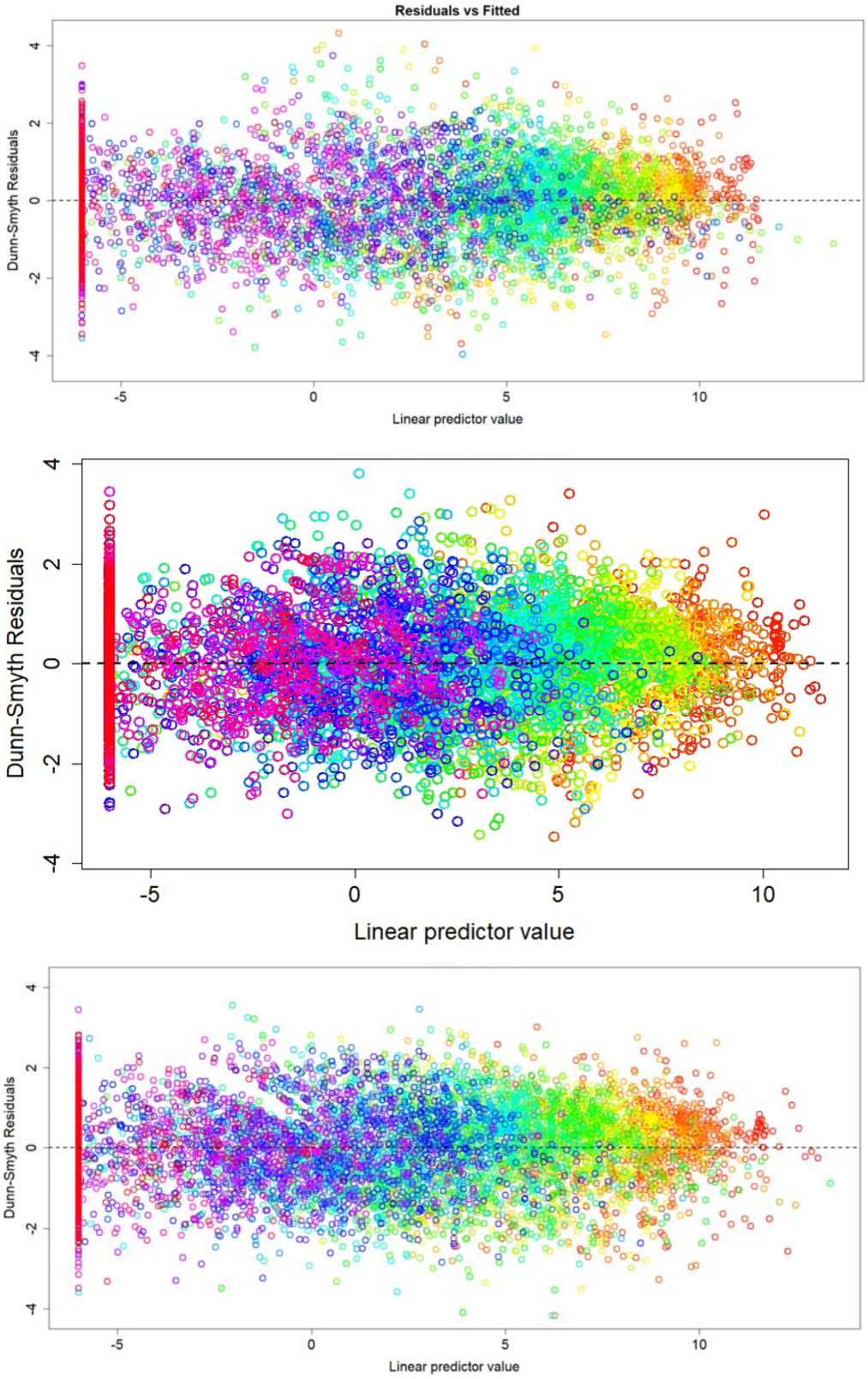

Figure 128. Residual distribution and adjusted data using a negative binomial model for bottom trawling métiers. Top: Llancà; center: Port de la Selva; bottom: Palamós.

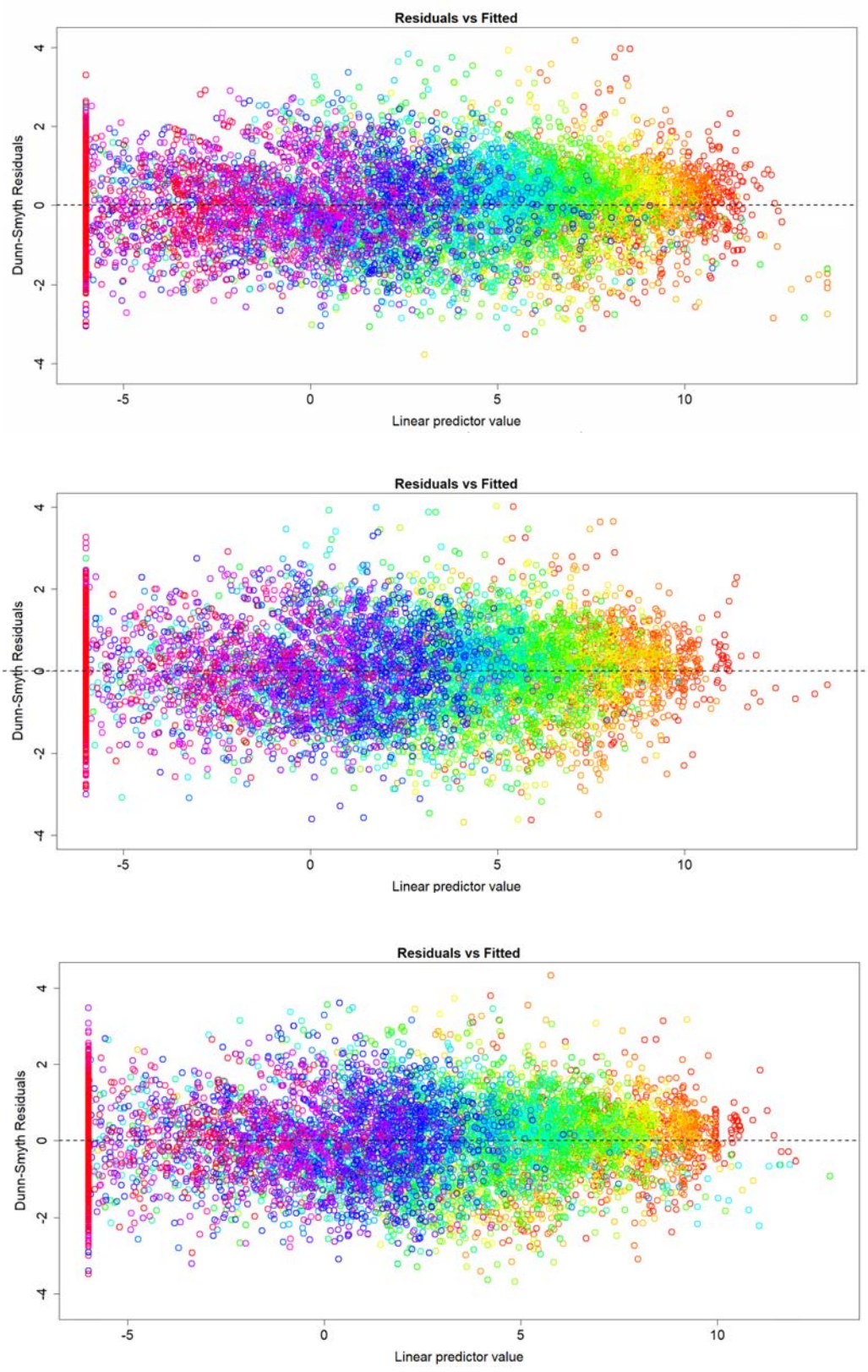

Figure 129. Residual distribution and adjusted data using a negative binomial model for bottom trawling métiers. Top: Roses; center: Blanes; bottom: Arenys de Mar.

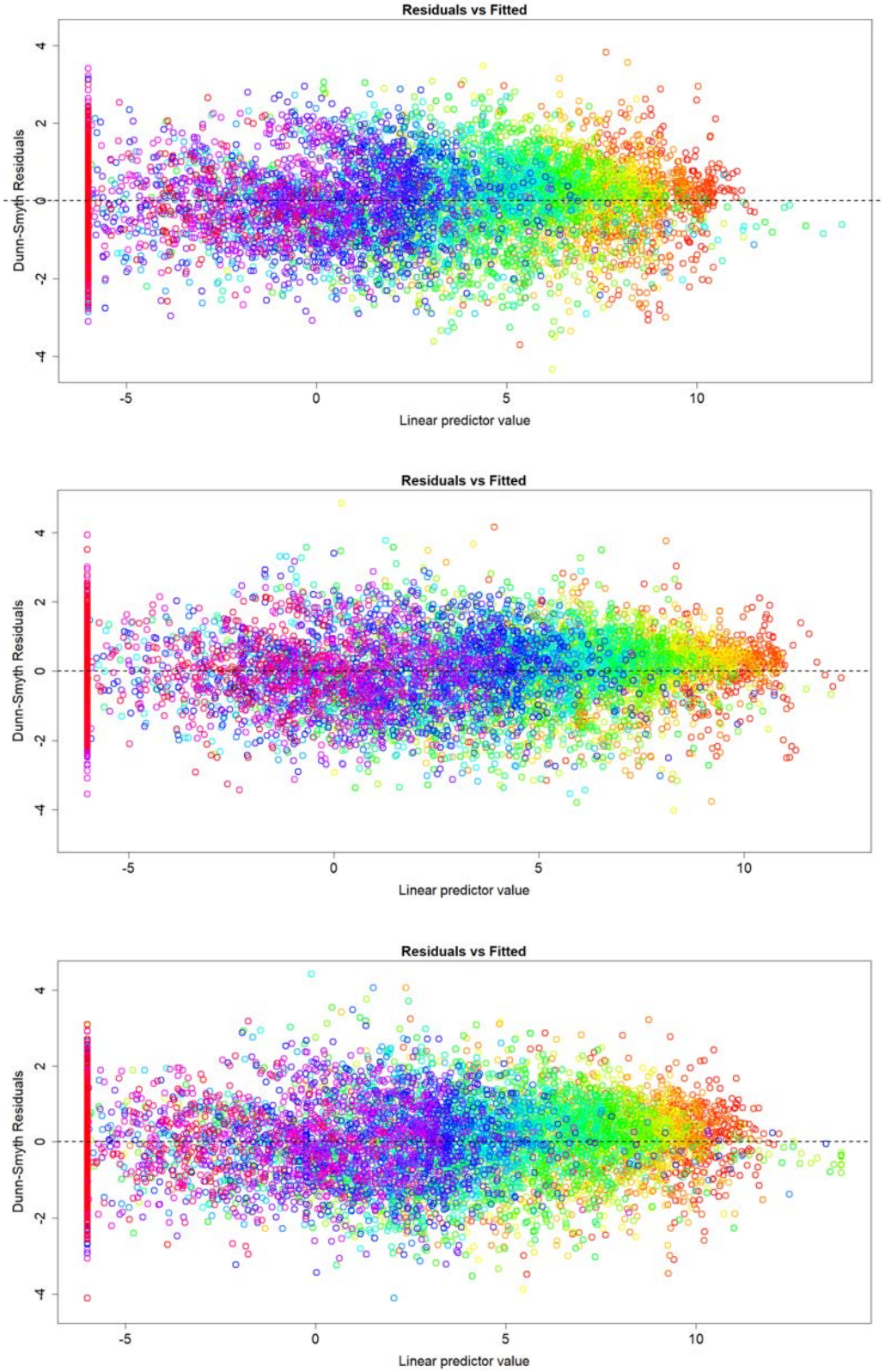

Figure 130. Residual distribution and adjusted data using a negative binomial model for bottom trawling métiers. Top: Barcelona; center: Vilanova i la Geltrú; bottom: Tarragona.

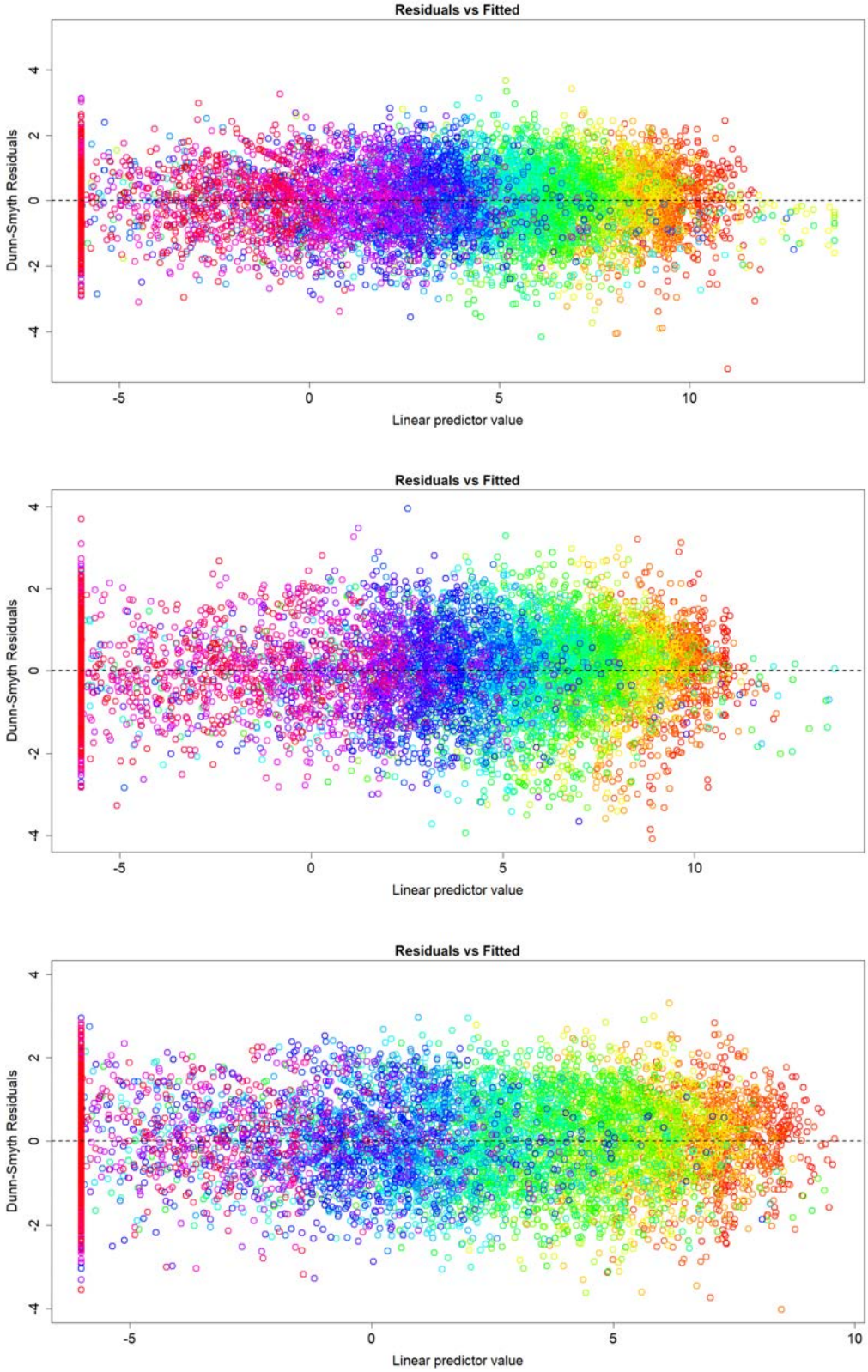

Figure 131. Residual distribution and adjusted data using a negative binomial model for bottom trawling métiers. Top: Cambrils; center: L'Ametlla de Mar; bottom: L'Ampolla.

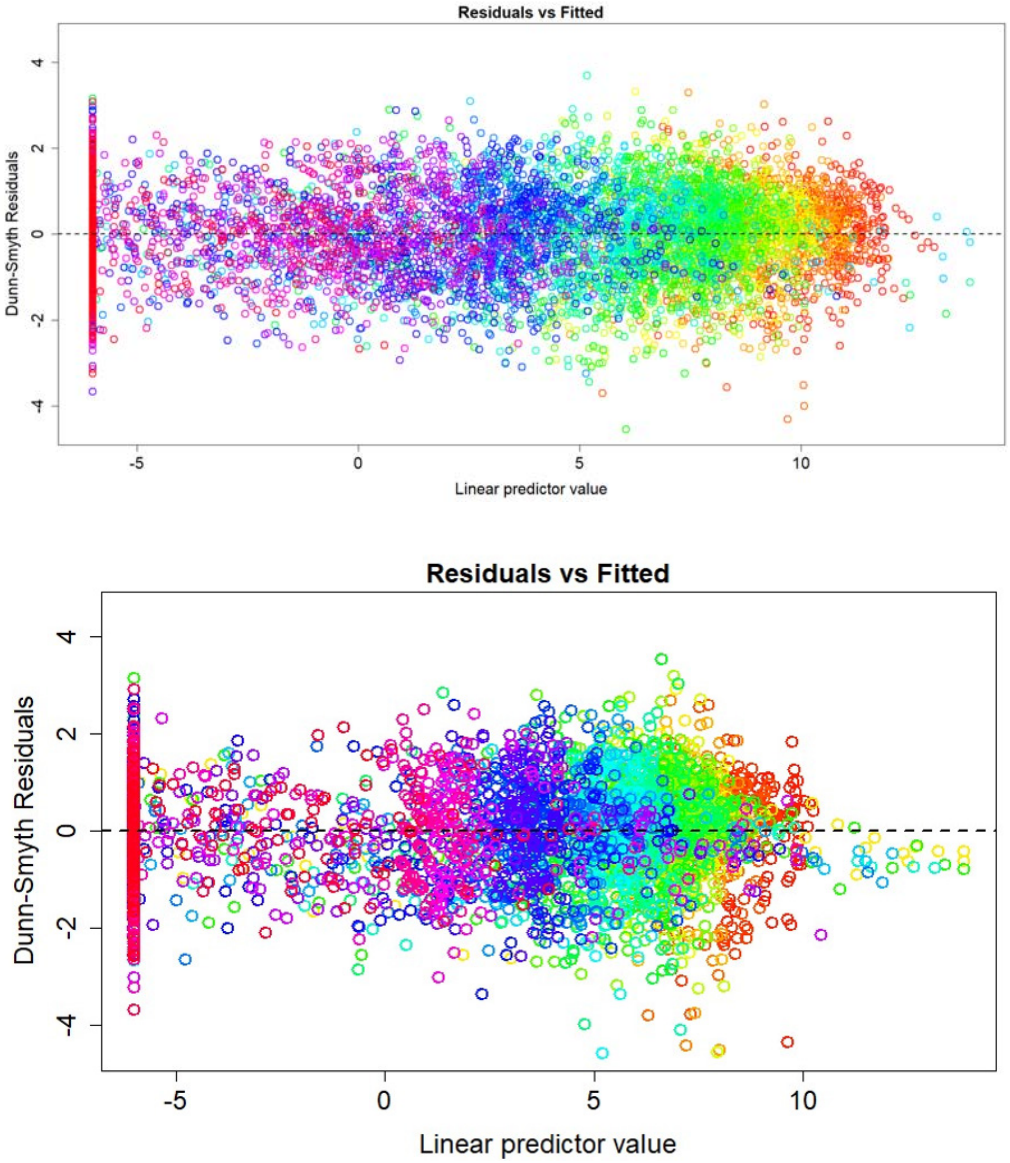

Figure 132. Residual distribution and adjusted data using a negative binomial model for bottom trawling métiers. Top: La Ràpita; bottom: Les Cases d'Alcanar.

Table 27. Statistical analysis results for bottom trawler métiers by port (Part I). Res.Df: residuals; Df.diff: degrees of freedom; Dev: standard deviation.

Multivariate test ANOVA	Res.Df	Df.diff	Dev	p-value
Llançà				
Métier-Métier	76	3	5 355	0.001***
Year-Year	75	1	1 488	0.001***
Métier-Year	72	3	579	0.065
Palamós				
Métier-Métier	75	3	3 943	0.001***
Year-Year	74	1	1 885	0.001***
Métier-Year	71	3	581	0.140
Port de la Selva				
Métier-Métier	61	3	3117	0.001***
Year-Year	60	1	1119	0.001***
Métier-Year	57	3	675	0.069
Roses				
Métier-Métier	74	3	4 153	0.001***
Year-Year	73	1	1 215	0.001***
Métier-Year	70	3	909	0.066
Blanes				
Métier-Métier	76	3	5 125	0.001***
Year-Year	75	1	1 549	0.001***
Métier-Year	72	3	643	0.049*
Arenys de Mar				
Métier-Métier	76	3	5 012	0.001***
Year-Year	75	1	1 823	0.001***
Métier-Year	72	3	1 369	0.024*
Barcelona				
Métier-Métier	79	3	3 331	0.001***
Year-Year	76	1	1 137	0.001***
Métier-Year	75	3	591	0.085

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 28. Statistical analysis results for bottom trawler métiers by port (Part II). Res.Df: residuals; Df.diff: degrees of freedom; Dev: standard deviation.

Multivariate test ANOVA	Res.Df	Df.diff	Dev	p-value
Vilanova I la Geltrú				
Métier-Métier	76	3	5 545	0.001***
Year-Year	75	1	1 603	0.001***
Métier-Year	72	3	762	0.021***
Tarragona				
Métier-Métier	76	3	5 791	0.001***
Year-Year	75	1	1 443	0.001***
Métier-Year	71	3	869	0.085
Cambrils				
Métier-Métier	76	3	1 907	0.001***
Year-Year	75	1	2 016	0.001***
Métier-Year	72	3	660	0.167
L'Ametlla de Mar				
Métier-Métier	76	3	2 028	0.001***
Year-Year	75	1	1 129	0.001***
Métier-Year	72	3	546	0.143
L'Ampolla				
Métier-Métier	76	3	2 084	0.001***
Year-Year	75	1	1 220	0.001***
Métier-Year	72	3	394	0.128
Sant Carles de la Ràpita				
Métier-Métier	69	3	3 825	0.001***
Year-Year	68	1	1 743	0.001***
Métier-Year	65	3	880	0.122
Les Cases d'Alcanar				
Métier-Métier	75	3	1 109	0.001***
Year-Year	74	1	1 099	0.001***
Métier-Year	71	3	165	0.479

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Annex 3

Species composition by port and landings by port and by métier

Table 29. Species composition and landings (in kg) by *métier* for Llançà

		North																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1	*Mullus* spp.	9 561	4 805	12 003	5 334	22 606	14 206	7 609	11 861	9 035	6 846	7 562	14 782	12 797	8 500	12 282	12 428	17 805	17 912	11 138	17 997
	Trachurus spp.	21 819	7 080	17 491	6 078	27 518	26 166	17 852	16 984	13 544	6 411	10 628	12 961	13 985	5 458	8 543	10 106	7 675	24 160	11 411	14 115
	Merluccius merluccius	46 867	15 647	21 627	7 689	29 539	10 454	19 954	17 236	13 203	10 541	10 864	19 162	18 745	10 068	11 248	10 728	11 657	22 129	9 016	13 240
	Lophius spp.	24 318	2 017	9 657	3 874	15 844	1 803	1 137	4 804	6 029	5 347	3 468	4 899	5 768	3 290	2 365	2 617	2 188	5 707	3 446	3 852
	Trisopterus spp.	29 230	3 144	11 098	5 614	24 728	2 468	1 982	2 813	2 833	4 803	3 198	4 984	3 381	844	1 854	3 387	2 618	9 540	4 312	3 605
	Eledone spp.	43 022	11 668	32 823	33 096	91 344	20 313	12 916	19 107	14 589	12 523	17 949	29 929	16 926	9 330	10 187	4 099	15 371	14 736	5 304	3 508
	Octopus vulgaris	9 835	5 760	5 602	6 169	19 747	9 516	11 125	6 679	5 319	9 528	11 964	12 654	9 178	8 019	8 722	2 502	6 893	7 627	1 771	655
	Pagellus acarne	14 371	10 838	13 600	7 942	12 366	12 232	10 353	16 401	14 545	14 916	10 891	6 769	8 251	7 184	5 161	679	5 930	3 295	902	321
	Loligo spp.	5 745	3 856	7 451	6 748	22 153	5 937	7 282	4 773	2 897	3 149	7 519	7 231	5 980	2 763	3 781	818	2 289	1 558	571	178
	Osteichthyes	12 781	5 399	9 107	5 488	10 237	5 500	4 781	4 644	7 743	3 742	3 222	4 416	2 459	3 292	2 808	120	35	0	0	0
OTB2	*Mullus* spp.	1 437	6 911	4 796	10 316	6 180	18 193	9 999	6 085	14 789	13 096	14 276	15 859	29 246	28 247	24 119	20 432	20 253	12 002	18 705	11 558
	Merluccius merluccius	76 062	92 608	29 806	47 937	36 888	55 159	110 550	104 609	92 523	56 790	89 581	129 217	134 416	71 758	56 928	36 251	45 785	16 644	12 521	8 793
	Eledone spp.	55 721	40 052	39 830	79 971	35 500	60 841	54 593	66 104	45 918	26 137	36 475	37 817	24 867	17 548	17 452	18 548	17 499	4 537	6 290	5 439
	Trachurus spp.	4 504	13 870	3 933	25 986	16 812	34 256	57 399	27 577	26 897	21 354	28 190	18 747	36 771	20 109	22 456	9 705	18 431	11 577	21 384	4 296
	Octopus vulgaris	5 233	6 200	4 288	4 419	4 068	10 404	13 599	4 921	4 981	8 569	9 021	7 389	5 939	3 650	5 394	6 051	3 746	2 108	1 584	3 034
	Ommastrephidae spp.	8 535	1 679	1 253	5 724	2 352	9 807	26 194	12 121	9 750	13 771	11 508	23 613	27 461	4 197	12 748	5 217	9 933	3 609	6 180	2 948
	Scomber scombrus	29 469	26 674	20 677	26 798	37 079	129 544	62 837	9 903	10 022	6 537	17 883	29 873	29 043	11 401	17 633	4 878	9 218	5 003	1 514	2 865
	Lophius spp.	10 136	20 374	15 790	27 442	25 292	20 443	18 055	22 878	28 326	19 704	16 119	20 764	27 888	18 869	12 657	8 184	8 535	5 278	6 450	2 110
	Triglidae spp.	7 302	15 496	10 233	15 375	7 395	13 957	13 098	9 524	8 585	10 958	13 075	9 357	10 885	8 102	10 112	8 561	9 642	4 525	5 271	1 979
	Trisopterus spp.	41 031	41 108	19 050	54 207	39 794	52 898	26 862	21 713	27 893	32 542	29 885	47 948	41 491	18 105	24 248	11 974	13 376	10 211	4 669	1 954
OTB3	*Micromesistius poutassou*	40 655	53 324	52 907	148 885	133 067	127 978	109 850	52 999	37 768	53 051	43 390	60 938	50 005	36 228	26 014	42 029	35 041	50 959	53 930	27 239
	Nephrops norvegicus	8 356	12 599	19 564	14 507	18 330	23 730	27 629	28 538	21 954	22 560	13 306	15 854	12 027	11 320	10 901	13 451	15 347	14 857	21 383	15 729
	Phycis spp.	8 079	9 155	8 393	6 471	8 138	11 191	15 584	13 038	10 619	14 557	11 329	10 832	7 679	8 572	9 464	12 570	13 896	13 167	9 245	13 561
	Lophius spp.	6 328	11 422	12 148	17 402	16 490	21 172	24 179	12 415	12 709	18 373	12 119	13 983	12 158	14 953	13 839	14 334	11 183	9 914	11 756	10 474
	Merluccius merluccius	6 788	11 965	9 811	11 705	11 432	11 748	15 781	13 942	13 515	15 327	15 500	17 959	14 771	8 769	11 318	19 183	11 462	13 382	7 557	10 144
	Trachurus spp.	2 246	11 487	5 763	2 829	1 014	8 980	9 745	4 672	5 604	8 873	7 285	7 271	10 155	5 876	8 114	14 900	5 501	7 188	3 213	8 369
	Lepidorhombus spp.	1 744	3 257	3 702	3 693	4 898	5 919	10 017	6 274	5 668	6 472	5 558	6 256	4 131	4 937	7 436	7 949	6 752	4 559	4 194	5 700
	Eledone spp.	3 009	2 490	3 332	7 136	4 788	7 394	6 022	7 433	5 043	7 261	7 176	9 674	4 661	3 206	4 668	7 101	9 997	4 892	2 268	3 836
	Lepidopus caudatus	6 852	10 179	14 638	15 183	5 979	10 447	13 376	10 171	4 820	3 235	2 944	1 690	913	579	204	213	35	41	12	0
	Osteichthyes	4 896	5 868	7 283	7 434	6 996	6 864	10 627	7 573	10 605	6 393	4 970	4 283	2 881	2 924	2 713	285	17	0	0	0
OTB4	*Aristeus antennatus*	15 512	24 446	17 290	4 722	5 650	11 902	16 427	18 230	10 944	10 168	9 190	8 333	4 963	10 284	14 796	13 399	12 039	7 023	15 351	16 428
	Phycis spp.	3 127	3 566	2 202	2 049	2 706	3 995	3 515	4 364	2 760	2 256	1 547	1 398	1 434	1 781	1 961	1 824	1 613	1 180	1 983	2 658
	Lophius spp.	1 368	2 017	1 422	905	1 121	2 274	1 599	1 666	935	1 304	829	814	1 372	1 714	2 042	1 654	1 064	1 646	2 308	1 930
	Merluccius merluccius	2 464	3 535	2 373	1 342	1 392	1 964	1 222	2 222	1 032	1 004	555	1 104	1 115	1 170	980	2 284	1 148	1 644	1 662	1 490
	Parapenaeus longirostris	0	0	0	0	0	0	0	0	0	0	2	8	10	48	357	368	797	422	940	1 313
	Ommastrephidae spp.	179	287	302	570	321	232	201	318	303	180	297	342	149	336	305	253	506	278	267	587
	Nephrops norvegicus	141	93	124	2	0	57	10	53	40	100	17	69	104	221	211	85	163	229	381	453
	Micromesistius poutassou	647	806	610	1 170	1 552	1 748	1 539	923	685	336	236	309	425	453	794	376	639	227	945	402
	Conger conger	787	1 574	1 197	271	172	428	524	354	242	115	245	301	135	326	263	164	260	185	218	268
	Osteichthyes	1 192	1 968	966	302	887	1 689	1 110	1 798	1 295	820	522	511	465	769	831	816	10	0	0	0

Table 30. Species composition and landings (in kg) by *métier* for Port de la Selva.

		North																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1	*Mullus* spp.	3 055	1 986	4 338	4 905	2 367	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3 143
	Merluccius merluccius	11 666	2 323	3 132	3 828	1 860	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 656
	Eledone spp.	11 832	2 648	10 637	13 721	6 323	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 802
	Trachurus spp.	4 879	1 063	3 257	3 275	1 252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 615
	Triglidae spp.	4 185	926	3 251	2 576	2 021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	674
	Pagellus acarne	3 354	3 037	4 413	2 165	1 005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	405
	Loligo spp.	1 632	1 310	2 595	4 202	2 395	0	0	0	0	0	0	0	0	0	0	0	0	0	0	186
	Sardina pilchardus	3 445	68 934	213	180	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
	Micromesistius poutassou	13 117	49	439	11	214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
	Engraulis encrasicolus	49 565	10 710	87	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
OTB2	*Trachurus* spp.	4 898	6 721	1 676	11 905	14 595	13 989	11 222	12 063	4 814	3 781	2 824	1 887	1 956	165	1 031	783	283	2 704	1 216	0
	Sardina pilchardus	13 757	7 992	2 568	2 538	1 441	3 438	3 355	2 863	310	181	139	6	181	31	3	0	0	48	56	0
	Trisopterus spp.	37 318	24 559	6 716	28 440	18 977	16 332	9 227	16 695	6 146	5 608	8 531	5 509	2 657	1 132	2 357	388	462	1 868	405	0
	Lophius spp.	13 673	11 987	9 449	15 490	11 036	7 100	4 538	12 663	5 920	3 397	2 736	2 389	1 435	942	1 047	341	298	1 312	381	0
	Scomber scombrus	22 496	18 399	7 305	15 608	24 488	55 122	22 627	8 971	2 389	687	5 303	3 242	2 771	209	2 477	351	565	1 805	156	0
	Merluccius merluccius	63 502	52 124	12 566	24 449	16 434	15 580	27 729	79 400	18 766	9 904	31 161	16 279	11 230	5 684	8 197	2 803	2 280	6 152	1 036	0
	Triglidae spp.	17 826	17 198	10 865	11 156	7 690	9 306	5 442	6 183	2 441	1 910	1 761	1 203	409	299	699	270	229	1 039	273	0
	Mullus spp.	2 328	4 164	3 485	4 446	3 987	6 675	3 519	6 210	3 003	3 189	3 497	2 490	2 332	1 545	2 697	872	965	3 557	1 410	0
	Eledone spp.	46 161	18 769	11 762	23 086	13 483	14 522	10 379	37 783	7 620	3 024	6 390	4 991	2 997	808	1 202	903	833	4 826	838	0
	Ommastrephidae spp.	6 624	1 011	396	2 231	1 234	2 299	3 945	5 723	1 788	1 814	1 266	2 608	1 310	226	945	218	288	1 053	217	0
OTB3	*Micromesistius poutassou*	18 988	25 660	20 679	101 352	119 489	72 281	30 294	27 655	31 243	12 524	40 380	17 213	44 803	31 152	7 116	6 389	14 424	12 628	2 994	3 505
	Nephrops norvegicus	11 187	15 041	14 456	24 444	21 432	13 446	5 194	8 065	15 675	7 558	10 872	4 438	9 501	7 003	2 917	3 338	5 103	2 996	591	1 378
	Lophius spp.	5 801	9 714	9 316	14 728	12 922	13 473	7 009	7 530	7 427	3 356	7 427	3 758	6 711	6 465	2 291	1 842	3 491	1 890	489	1 164
	Phycis spp.	8 100	6 545	3 884	6 529	5 300	3 873	2 282	3 657	4 205	2 028	4 933	2 070	2 603	2 774	869	359	2 562	1 931	274	1 031
	Merluccius merluccius	3 435	5 263	2 898	8 288	5 621	3 987	2 033	8 082	4 292	1 585	5 033	3 088	4 561	3 073	1 608	1 422	2 742	1 854	323	583
	Triglidae spp.	2 806	2 662	2 552	3 500	3 137	2 069	1 086	1 040	1 155	809	1 081	945	1 773	1 613	546	401	1 579	658	257	458
	Trachurus spp.	288	2 875	3 551	1 175	1 537	6 067	12 026	11 480	4 611	3 179	2 202	1 787	2 712	2 775	688	270	1 462	1 163	421	415
	Eledone spp.	1 946	1 250	1 335	4 159	4 793	1 984	899	2 839	1 678	351	2 395	1 303	1 447	1 175	215	317	1 619	915	61	368
	Helicolenus dactylopterus	2 103	3 080	2 669	4 392	4 046	3 509	2 049	2 435	3 321	2 106	3 037	1 402	1 794	1 547	688	580	1 649	751	285	345
	Lepidopus caudatus	2 392	3 973	6 075	11 726	6 776	13 495	5 061	3 238	9 268	3 268	5 463	928	2 522	1 400	205	77	40	13	0	0
OTB4	*Aristeus antennatus*	36 646	30 318	25 989	3 725	8 643	30 077	57 943	56 062	26 946	44 200	22 038	40 904	32 605	40 522	43 550	33 974	30 437	15 906	15 764	14 958
	Phycis spp.	5 174	7 309	5 889	2 613	4 614	8 604	9 563	11 930	9 415	7 786	6 765	7 584	4 720	5 387	5 096	4 064	5 164	3 317	1 607	1 524
	Lophius spp.	2 967	3 462	3 077	1 525	3 210	6 952	5 569	6 142	3 802	4 001	2 834	3 315	3 869	6 314	5 915	4 471	2 990	2 077	991	1 109
	Merluccius merluccius	5 412	6 583	4 332	1 553	1 881	5 480	5 431	6 956	4 648	5 593	3 280	6 565	8 730	5 631	4 852	5 193	3 669	3 513	1 129	949
	Gambes varies	0	0	0	0	0	0	153	2 814	1 202	2 065	964	2 023	1 439	1 935	2 040	2 292	1 608	778	583	580
	Conger conger	2 210	2 108	2 194	493	722	1 788	3 178	2 895	1 003	1 401	635	1 006	908	841	805	452	919	464	332	138
	Micromesistius poutassou	1 901	2 307	1 746	1 865	5 525	16 180	5 877	5 270	3 249	2 180	1 325	2 409	2 320	2 391	2 121	1 319	1 074	396	298	104
	Taurons	3 645	4 364	2 699	1 757	1 222	2 901	2 901	2 821	2 934	2 197	1 025	1 243	1 037	1 923	1 742	1 774	905	319	49	11
	Sardina pilchardus	0	0	20 210	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
	Osteichthyes	1 671	1 452	1 754	833	1 147	2 880	1 216	672	1 888	2 536	678	675	446	587	711	438	25	0	0	0

Table 31. Species composition and landings (in kg) by *métier* for Roses.

		North																			
		2 002	2 003	2 004	2 005	2 006	2 007	2 008	2 009	2 010	2 011	2 012	2 013	2 014	2 015	2 016	2 017	2 018	2 019	2 020	2 021
OTB1	*Mullus* spp.	27 505	30 603	28 011	23 682	31 844	63 978	30 733	28 218	0	20 060	22 385	50 399	32 260	32 206	28 437	8 072	29 985	34 553	47 632	41 563
	Merluccius merluccius	177 931	32 310	42 224	67 709	18 355	79 867	248 065	36 628	0	15 881	100 636	155 594	30 264	10 486	6 416	22 433	14 328	45 972	58 997	25 946
	Trachurus spp.	35 916	17 960	26 142	39 627	17 361	62 441	163 122	23 454	0	17 639	58 104	61 908	23 201	11 481	5 710	42 481	11 462	29 590	88 997	25 694
	Eledone spp.	105 178	21 271	48 901	93 124	23 923	114 859	95 873	24 840	0	11 548	124 054	139 522	21 960	8 843	8 695	8 194	13 245	50 929	34 720	18 049
	Ommastrephidae spp.	20 439	716	2 359	7 838	2 404	14 103	53 729	3 185	0	4 393	20 217	49 230	17 052	1 101	2 367	4 086	1 876	28 440	47 035	17 522
	Trigilidae spp.	28 740	10 178	16 276	15 662	6 933	24 540	25 338	5 341	0	5 357	15 247	21 417	5 028	2 920	3 333	9 494	5 653	15 625	19 034	9 476
	Pagellus acarne	18 741	15 992	18 229	12 332	11 184	17 071	20 002	18 287	0	17 121	9 427	14 710	11 904	12 249	13 971	475	12 398	6 483	5 497	8 903
	Lophius spp.	22 165	2 734	8 417	9 282	1 712	21 869	31 104	2 911	0	2 594	20 562	27 296	5 434	3 766	2 397	5 266	3 557	18 566	24 541	8 188
	Trisopterus spp.	24 772	2 729	9 718	19 035	3 545	26 268	20 878	3 508	0	1 671	19 414	27 926	3 687	1 066	1 040	4 453	2 597	18 347	25 161	4 208
	Loligo spp.	26 263	19 080	20 964	24 078	23 031	19 787	23 085	12 321	0	8 465	19 335	16 895	11 637	4 701	4 542	435	6 620	4 631	2 579	3 902
OTB2	*Merluccius merluccius*	80 797	131 738	64 160	51 851	79 260	28 430	27 727	231 246	177 695	122 982	25 030	58 852	128 317	81 784	108 970	58 322	75 262	35 526	0	33 321
	Ommastrephidae spp.	8 096	5 186	4 624	5 436	8 946	3 862	7 122	25 029	29 188	49 341	5 370	14 476	70 938	11 430	32 103	12 862	47 836	14 529	0	29 417
	Trachurus spp.	25 100	37 322	21 427	19 252	33 826	60 594	41 257	160 731	157 511	61 504	38 363	38 911	88 860	54 829	55 326	22 621	63 036	91 490	0	20 157
	Eledone spp.	47 480	69 312	80 179	65 690	138 897	21 509	8 507	132 493	115 176	66 816	21 915	44 706	101 175	55 798	67 055	48 847	77 891	15 918	0	19 815
	Mullus spp.	5 934	9 611	8 883	10 061	13 490	5 653	758	14 199	40 458	10 160	4 645	6 934	19 879	38 421	47 554	45 393	35 074	19 987	0	14 167
	Lophius spp.	22 387	32 425	28 993	28 511	23 288	21 352	26 006	31 771	39 319	24 884	10 048	11 639	31 998	28 915	24 240	18 928	22 771	12 251	0	10 567
	Trisopterus spp.	22 348	25 673	21 487	26 036	34 017	10 267	1 405	30 255	30 764	24 329	8 571	16 566	33 194	14 925	22 356	13 108	20 025	21 815	0	7 442
	Triglidae spp.	14 536	24 939	21 732	19 162	20 001	9 700	4 268	22 592	28 521	21 449	7 515	8 784	19 045	19 028	22 618	18 925	28 960	16 175	0	6 407
	Micromesistius poutassou	168 923	51 318	19 803	30 867	6 351	170 822	141 228	7 634	13 618	3 600	15 923	64 473	13 410	4 396	7 152	139	7 151	4 013	0	1 026
	Engraulis encrasicolus	2 874	19 029	15 001	1 287	12 006	1 439	81	13 330	77 421	10 637	334	625	11 066	5 267	2 835	1 385	759	388	0	275
OTB3	*Parapenaeus longirostris*	2 322	3 524	5 977	2 987	2 333	913	370	701	1 481	2 199	2 312	1 251	3 048	5 870	32 434	26 466	6 547	7 002	14 131	35 192
	Micromesistius poutassou	83 112	121 937	150 271	342 038	360 764	292 117	25 411	171 230	183 082	255 473	89 562	132 326	142 193	58 246	47 559	56 057	60 199	84 732	41 514	31 922
	Merluccius merluccius	20 780	62 813	43 239	65 329	47 216	25 693	6 213	65 831	61 333	66 805	32 762	46 998	66 092	36 564	39 730	44 946	27 079	41 865	17 589	25 127
	Phycis spp.	41 880	31 453	26 459	20 308	23 677	21 471	9 125	30 779	24 437	31 798	24 943	22 105	30 856	31 253	27 615	25 630	27 284	36 587	12 494	24 862
	Nephrops norvegicus	34 624	39 440	40 103	42 558	63 004	49 327	16 862	54 573	49 534	36 227	32 257	45 200	43 300	24 182	26 280	27 632	28 930	28 444	11 540	16 335
	Trachurus spp.	1 824	41 539	23 482	7 939	8 817	904	265	58 186	64 528	64 497	17 385	8 047	49 102	34 857	20 879	18 204	11 738	23 954	30 686	14 736
	Lophius spp.	20 313	26 121	24 399	33 397	29 109	21 758	8 131	30 314	23 223	31 144	18 182	17 152	24 147	25 334	23 700	18 090	15 684	15 579	9 273	12 236
	Ommastrephidae spp.	2 803	4 356	5 762	7 059	5 148	1 941	1 461	15 659	14 664	27 271	4 251	9 979	15 744	5 539	6 093	4 021	11 674	6 275	4 927	10 607
	Aristeus antennatus	8 532	8 900	9 981	763	5 695	6 478	21 812	10 509	6 797	8 333	6 997	11 851	7 352	10 747	10 649	4 598	1 844	1 641	1 928	7 175
	Eledone spp.	6 297	4 927	10 696	19 760	16 484	7 353	601	16 528	15 961	23 389	8 173	8 486	11 495	8 633	9 275	14 576	13 467	9 958	3 826	6 137
OTB4	*Aristeus antennatus*	37 156	25 862	25 338	6 908	83	26 234	54 175	59 087	28 599	33 683	36 373	48 259	27 587	52 195	54 862	42 735	32 090	28 237	49 432	27 898
	Gambes varies	0	0	0	0	4	59	525	3 885	1 665	2 009	1 643	2 910	2 042	3 058	2 450	4 001	2 137	1 654	3 042	1 778
	Phycis spp.	5 226	3 520	4 254	2 663	4 957	5 891	6 620	6 821	5 397	3 405	7 444	5 158	4 836	5 804	4 088	4 498	5 412	3 086	7 320	1 617
	Lophius spp.	1 982	2 094	2 604	952	21 746	2 402	3 329	2 991	1 829	1 891	1 893	1 969	2 432	3 248	2 270	2 627	1 459	1 768	7 625	1 301
	Merluccius merluccius	2 522	2 070	2 688	1 251	33 241	2 087	2 589	2 991	2 274	1 181	1 680	2 793	3 742	2 474	1 270	2 818	1 518	1 863	6 808	881
	Trisopterus spp.	5	0	24	0	25 859	0	148	1	78	4	4	46	6	11	0	55	0	662	1 297	488
	Micromesistius poutassou	660	475	1 729	364	44 434	1 974	1 309	1 136	392	738	729	1 186	789	482	173	369	642	111	9 332	109
	Eledone spp.	108	18	149	20	35 990	3	141	103	426	22	108	427	127	148	213	446	415	185	708	63
	Engraulis encrasicolus	13	0	3	0	833	28 540	28 644	52 050	146	85 710	453	257	0	0	0	0	6	0	0	0
	Sardina pilchardus	0	0	0	0	64	218 580	87 629	102 410	94	61 910	6	26	0	0	0	0	0	0	0	0

Table 32. Species composition and landings (in kg) by *métier* for Palamós.

		North																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1	*Mullus* spp.	13 059	18 692	10 550	14 701	20 692	30 541	24 663	28 635	33 533	19 673	14 294	25 439	25 059	13 892	18 446	17 110	10 867	7 779	7 508	8 992
	Merluccius merluccius	13 010	23 384	6 779	17 046	23 145	16 276	38 652	43 520	25 182	23 672	26 797	27 241	17 283	12 293	8 993	8 204	1 838	5 528	1 853	3 796
	Lophius spp.	4 335	10 200	3 769	7 623	14 217	35 120	15 261	18 319	22 019	19 931	16 593	14 530	16 557	8 786	6 094	7 406	1 320	8 597	2 843	3 666
	Trachurus spp.	16 658	19 776	8 649	56 584	59 598	48 682	123 716	113 146	82 630	28 133	35 512	29 088	31 077	16 469	11 159	13 062	4 304	12 593	1 630	2 453
	Ommastrephidae spp.	4 090	1 291	568	3 603	3 339	4 881	20 940	10 768	14 878	26 076	10 214	17 807	18 500	2 686	6 016	2 544	482	4 623	1 561	2 278
	Eledone spp.	18 927	27 662	11 922	29 410	41 168	64 716	25 521	38 394	23 518	17 275	17 864	14 142	7 241	8 443	6 536	7 001	476	5 233	607	1 457
	Loligo spp.	10 492	15 366	12 767	15 555	13 563	9 654	15 445	12 389	10 903	10 623	8 925	7 473	8 815	2 345	3 102	1 999	2 707	525	381	1 447
	Pagellus acarne	8 638	13 984	8 994	11 887	13 138	13 563	13 147	13 671	12 362	9 733	6 628	4 669	6 429	2 522	2 329	1 981	3 329	685	1 550	1 285
	Scomber scombrus	2 483	2 233	4 445	7 509	7 250	278 280	40 250	7 129	4 643	2 024	3 760	2 198	1 469	738	946	338	47	421	273	82
	Osteichthyes	29 574	50 026	27 110	48 120	23 825	36 404	26 116	35 315	27 568	23 702	19 058	15 485	11 302	7 594	7 132	6 914	229	0	0	0
OTB2	*Parapenaeus longirostris*	0	0	0	8	3	0	6	0	35	6	15	103	352	1 489	4 859	4 925	6 821	2 575	23 824	43 719
	Trachurus spp.	5 186	4 038	17 713	12 285	783	0	58	31	74	36	40	58	2 213	1 443	425	50	7 790	1 284	9 115	43 585
	Lophius spp.	28 208	22 195	29 056	26 676	23 283	0	10 922	11 546	14 080	11 536	9 173	11 627	17 745	15 569	10 964	10 167	16 353	13 644	16 987	14 640
	Ommastrephidae spp.	7 738	916	2 751	2 550	1 319	0	7 660	3 170	4 736	8 280	3 249	7 420	11 895	2 306	6 270	2 883	17 718	6 128	8 932	14 560
	Merluccius merluccius	23 949	20 707	25 231	26 582	12 339	0	4 254	3 845	1 673	1 534	1 856	2 933	3 830	6 652	6 901	5 572	9 411	4 938	7 243	14 181
	Mullus spp.	7 983	3 997	5 873	6 444	3 554	0	2 277	1 013	1 739	996	680	2 005	4 244	6 662	8 724	6 180	13 163	12 292	6 354	10 744
	Eledone spp.	88 213	54 447	79 673	66 357	49 007	0	23 650	39 690	26 699	22 246	32 711	28 246	21 206	27 774	20 721	16 680	19 332	10 795	5 131	9 944
	Trisopterus spp.	26 921	8 973	17 791	27 004	22 876	0	3 774	3 394	3 785	3 251	6 537	7 628	8 947	4 247	5 675	3 881	6 572	7 097	5 117	2 402
	Micromesistius poutassou	16 607	21 351	15 019	48 083	10 020	0	478	176	40	26	5	29	161	20	147	3	274	36	642	619
	Osteichthyes	49 266	34 069	44 186	23 917	11 283	0	10 957	17 774	13 729	12 744	9 859	10 774	10 212	13 522	12 754	11 400	1 470	0	0	0
OTB3	*Trachurus* spp.	3 516	2 994	1 734	608	1 961	20 261	20 550	10 746	13 009	21 050	3 889	486	7 884	12 340	3 165	9 251	5 640	22 456	21 817	28 815
	Parapenaeus longirostris	0	0	0	75	277	46	488	1 300	2 207	2 189	1 759	1 444	2 188	3 909	17 643	13 704	9 236	13 071	17 512	24 848
	Phycis spp.	40 139	23 078	18 195	14 677	21 313	26 039	26 309	27 746	16 495	27 463	21 363	13 207	16 645	21 004	17 033	18 769	22 389	34 022	12 461	17 813
	Micromesistius poutassou	175 268	190 838	132 349	309 593	496 930	579 956	101 431	144 764	125 206	171 120	34 252	56 453	60 658	22 368	20 244	28 912	39 216	47 175	21 599	17 517
	Merluccius merluccius	43 593	54 891	35 058	33 426	30 616	20 011	27 733	43 996	20 902	35 727	29 231	26 451	36 706	21 366	22 816	16 908	16 669	21 271	10 153	13 625
	Nephrops norvegicus	33 932	40 357	37 645	28 705	34 481	35 918	35 265	62 524	37 543	46 932	36 136	36 981	33 585	21 130	23 041	22 248	24 457	28 661	18 133	12 800
	Lophius spp.	17 593	14 893	11 422	16 437	21 193	19 070	19 502	17 985	10 975	14 857	10 202	7 610	6 322	10 944	9 835	6 325	8 470	9 373	5 991	4 748
	Eledone spp.	10 624	5 432	6 562	15 739	21 806	8 329	5 248	11 010	4 914	5 447	4 100	5 979	3 192	6 009	7 096	7 208	10 948	7 037	2 290	2 818
	Aristeus antennatus	19 903	16 054	11 224	1 648	2 484	4 624	17 877	9 040	516	11 651	9 747	273	625	10 656	9 112	4 711	2 506	2 732	2 995	344
	Osteichthyes	20 303	15 337	17 030	14 251	14 753	11 271	15 322	15 044	10 113	13 325	9 362	6 730	5 717	6 588	7 554	8 250	149	0	0	0
OTB4	*Aristeus antennatus*	136 315	100 434	94 591	57 409	58 779	118 598	155 355	147 206	117 369	122 779	130 878	140 561	92 189	127 678	106 062	91 128	91 843	72 237	68 439	75 759
	Phycis spp.	16 549	9 979	9 914	11 599	13 534	16 647	18 710	19 899	19 282	15 587	16 988	15 713	17 472	10 704	9 518	11 519	10 490	16 888	9 777	14 853
	Lophius spp.	5 318	4 690	4 775	4 339	3 776	6 396	6 473	6 941	6 795	6 362	4 277	5 695	7 384	4 569	3 704	4 668	3 175	5 086	4 024	4 597
	Merluccius merluccius	7 306	7 130	6 423	7 903	6 377	7 263	6 755	10 102	8 475	6 706	4 422	7 774	8 153	2 972	2 892	3 491	3 102	5 398	3 012	4 055
	Nephrops norvegicus	1 636	306	394	3 731	897	2 267	2 240	1 441	7 795	1 005	1 473	7 145	5 971	926	636	745	901	691	1 511	2 842
	Ommastrephidae spp.	285	237	150	431	450	332	737	1 521	3 455	2 076	1 340	2 365	2 365	1 545	1 202	1 126	2 376	1 677	1 166	2 197
	Micromesistius poutassou	7 362	8 247	6 812	15 060	12 163	15 511	11 387	11 331	19 302	16 985	1 788	9 329	4 828	1 214	1 014	1 473	1 609	1 575	1 502	1 314
	Eledone spp.	2 322	516	2 090	1 207	135	512	138	1 320	566	928	1 268	767	555	1 022	1 600	513	2 367	412	725	902
	Gambes varies	0	0	0	5 840	9 082	9 461	7 258	14 696	8 827	8 771	8 493	7 917	9 049	7 260	7 506	9 520	4 066	6 763	111	732
	Osteichthyes	15 727	11 234	15 706	5 258	3 192	3 350	3 229	1 661	2 036	2 172	1 476	2 810	1 022	932	873	644	4	0	0	0

Table 33. Species composition and landings (in kg) by *métier* for Blanes.

		Center																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1	*Trachurus* spp.	81 489	14 272	22 083	48 331	41 871	7 242	18 325	19 658	11 972	16 059	31 824	29 191	43 667	30 978	13 435	9 225	40 932	15 103	9 995	32 509
	Mullus spp.	10 574	12 006	8 084	6 715	20 369	3 663	13 013	10 497	15 674	4 866	8 518	9 472	11 604	5 668	7 813	5 976	19 056	6 252	8 816	20 551
	Pagellus erythrinus	10 739	10 250	7 020	7 838	11 331	2 063	9 813	8 564	9 769	4 620	8 420	13 976	18 029	8 357	7 588	5 200	7 492	3 469	3 213	5 030
	Merluccius merluccius	11 647	11 705	8 653	5 084	7 972	2 206	9 872	7 883	5 155	7 701	6 404	6 570	7 376	5 799	2 078	1 846	2 604	1 391	769	3 971
	Loligo spp.	10 905	11 336	15 070	13 385	16 000	413	8 984	9 849	6 666	7 990	11 485	8 824	11 274	3 469	5 645	2 512	3 896	1 514	2 031	3 496
	Aristeus antennatus	2 678	2 325	3 684	2 749	1 472	3 493	9 184	6 423	7 207	10 671	11 491	11 144	6 437	9 022	6 816	3 445	3 654	4 083	3 917	3 301
	Pagellus acarne	17 021	13 014	9 400	12 308	13 762	959	10 578	13 877	14 541	7 525	7 163	10 771	19 133	5 814	3 701	3 626	4 061	2 040	3 067	2 061
	Scomber scombrus	231 539	97 253	43 080	49 049	130 934	576 847	158 272	22 618	387	17 324	3 125	1 528	328	370	83	137	153	58	56	230
	Micromesistius poutassou	1 410	685	3 757	1 320	17 223	17 548	2 901	13 570	3 385	17 806	513	1 124	3 842	1 061	170	109	1 400	96	56	213
	Boops boops	11 530	7 110	8 505	3 729	3 688	680	5 015	5 422	3 305	329	4 268	1 000	2 121	91	70	226	1 231	350	0	61
OTB2	*Ommastrephidae* spp.	2 131	941	630	747	777	1 620	8 914	2 976	11 290	8 627	3 913	12 928	7 022	1 360	6 905	1 338	9 795	2 569	3 660	5 703
	Lophius spp.	17 359	14 170	16 531	18 410	24 608	23 824	15 307	12 317	14 148	13 633	11 860	17 620	18 685	11 479	10 043	10 090	9 779	10 192	9 998	4 002
	Merluccius merluccius	1 446	2 740	2 334	869	700	2 556	3 278	3 430	2 048	3 243	3 034	11 295	2 775	3 513	6 497	4 427	2 516	1 952	1 589	2 682
	Triglidae spp.	9 145	9 185	13 063	12 257	16 249	11 193	7 150	7 350	6 499	6 292	5 051	8 637	7 825	7 278	8 787	6 367	5 886	6 130	4 797	1 925
	Mullus spp.	15 384	12 052	11 122	12 070	10 626	35 041	12 108	8 656	13 928	8 918	5 978	20 107	18 834	16 101	23 446	16 773	18 255	14 355	12 041	1 540
	Eledone spp.	29 856	22 768	31 303	35 714	33 382	27 003	20 367	26 566	16 336	12 478	18 282	20 122	11 015	8 815	8 059	5 715	5 826	3 894	2 011	1 441
	Trachurus spp.	545	2 234	4 165	2 995	2 229	7 717	3 666	5 044	1 110	1 523	2 043	11 672	4 201	3 406	8 416	7 059	4 455	6 514	6 990	1 092
	Trisopterus spp.	3 541	1 983	1 877	3 773	6 639	4 308	2 249	2 237	1 958	2 855	3 512	8 621	5 878	2 680	4 426	2 660	2 473	3 141	1 125	420
	Octopus vulgaris	8 620	4 269	6 215	6 432	6 525	10 318	6 355	2 905	1 674	2 493	3 229	8 986	2 482	3 221	3 914	1 791	1 086	977	378	121
	Osteichthyes	10 694	10 278	15 991	12 863	11 937	14 474	13 544	10 626	6 753	6 829	6 617	7 795	8 385	7 573	8 082	5 269	648	0	0	0
OTB3	*Parapenaeus longirostris*	747	953	1 280	1 580	636	206	275	584	1 422	1 961	1 671	2 423	3 870	2 958	17 092	16 785	9 403	10 376	15 398	17 671
	Phycis spp.	32 653	20 366	13 953	15 828	26 504	19 366	22 065	15 819	15 646	19 619	23 249	20 342	20 987	20 173	16 177	22 178	22 886	26 126	12 313	16 055
	Nephrops norvegicus	25 836	24 737	23 679	25 622	27 803	28 083	28 911	38 872	34 666	35 316	37 157	38 308	36 429	18 696	17 004	24 723	28 815	22 299	13 501	12 143
	Merluccius merluccius	12 882	18 725	10 308	13 897	17 366	6 678	7 834	12 625	4 602	7 034	12 606	15 156	23 437	8 050	13 775	13 213	9 264	12 065	6 091	6 560
	Micromesistius poutassou	59 002	62 854	35 918	108 045	302 154	200 903	31 265	18 488	16 121	13 879	18 887	36 716	28 212	9 559	7 737	10 535	14 472	15 692	8 751	6 102
	Lepidorhombus spp.	2 456	3 251	2 031	2 580	5 807	4 075	4 829	3 655	3 161	2 851	3 366	4 612	2 788	2 203	3 520	3 236	3 979	2 360	1 787	2 029
	Lophius spp.	9 486	9 167	5 709	10 243	12 639	10 663	8 903	5 014	4 086	5 106	7 062	6 842	4 387	5 922	3 859	4 625	5 232	4 106	3 038	1 820
	Eledone spp.	5 498	3 731	5 255	8 869	8 612	3 548	2 694	4 359	2 011	1 971	4 432	5 562	1 556	2 970	2 669	5 318	4 764	2 675	1 192	1 486
	Trachurus spp.	3 566	2 237	664	12 638	17 715	3 583	6 793	236	606	156	6 324	2 380	2 118	985	1 009	3 998	1 085	1 789	2 918	1 108
	Osteichthyes	4 096	5 087	6 169	8 608	9 482	3 706	5 035	3 204	3 471	2 455	4 200	3 610	3 770	7 204	4 197	2 448	1 129	0	0	0
OTB4	*Aristeus antennatus*	70 192	38 242	41 691	27 866	30 262	62 473	72 583	76 608	51 182	62 832	59 365	65 673	62 055	106 243	84 919	68 203	52 117	58 895	63 813	52 684
	Phycis spp.	13 203	8 094	9 710	6 219	8 929	10 304	10 099	11 162	11 389	8 476	6 776	8 844	9 894	7 393	13 099	12 411	8 080	9 874	8 166	8 847
	Gambes varies	653	609	396	40	62	95	13	22	62	45	46	38	50	23	38	30	3 270	4 211	4 905	2 770
	Merluccius merluccius	6 904	4 330	5 852	3 627	2 932	4 277	4 548	6 580	4 841	6 194	2 919	4 849	6 975	3 543	4 899	4 346	2 190	4 511	3 095	2 587
	Lophius spp.	4 176	2 881	3 454	2 079	2 325	3 986	4 871	4 339	3 183	2 905	1 799	2 165	2 730	2 273	3 157	2 598	1 145	1 548	2 068	1 585
	Ommastrephidae spp.	735	982	1 158	1 538	1 738	994	918	1 119	1 928	2 485	754	1 579	1 261	798	1 194	909	1 866	947	659	878
	Micromesistius poutassou	9 295	11 027	10 827	9 423	14 233	15 535	9 654	14 919	9 426	7 208	1 963	4 294	5 486	1 408	2 260	1 463	1 319	1 729	1 623	636
	Nephrops norvegicus	1 720	1 351	4 229	1 404	1 562	1 511	2 334	1 675	1 390	1 252	474	713	878	469	2 119	1 448	376	309	872	400
	Pagellus bogaraveo	1 117	2 305	5 652	1 418	255	649	1 407	2 354	1 047	1 739	567	382	649	500	417	714	36	108	45	95
	Osteichthyes	9 264	6 522	10 014	4 774	5 288	6 240	5 266	6 812	5 680	4 636	4 919	5 196	5 080	7 159	9 343	7 967	258	0	0	0

Table 34. Species composition and landings (in kg) by *métier* for Arenys de Mar.

Center																					
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1	*Mullus* spp.	18 531	23 138	19 696	17 161	30 415	26 636	32 678	12 656	13 506	12 136	17 022	22 076	16 726	18 100	24 310	28 485	30 193	28 390	19 317	9 824
	Loligo spp.	8 367	8 194	16 097	7 653	22 812	3 642	11 307	6 670	8 742	10 981	12 298	10 714	11 550	6 625	8 398	5 961	5 345	3 626	2 780	5 686
	Pagellus acarne	11 736	18 374	11 060	7 902	12 069	6 525	12 401	9 898	12 909	14 446	13 896	12 938	11 589	9 919	8 607	10 750	14 312	13 940	8 949	5 149
	Pagellus erythrinus	6 372	8 278	5 638	3 619	13 743	7 022	10 105	7 114	10 169	8 969	9 362	13 333	10 568	9 844	11 716	12 670	11 985	9 850	7 883	3 329
	Trachurus spp.	8 370	5 926	13 917	20 762	15 421	7 541	89 712	9 308	7 503	14 999	13 213	14 318	10 900	13 189	10 481	12 358	17 429	16 373	6 433	3 093
	Merluccius merluccius	9 602	5 712	16 333	6 491	15 600	8 843	24 249	3 455	7 605	15 333	12 976	15 326	4 240	16 265	7 892	13 764	8 392	8 641	2 154	2 407
	Rajades	2 069	2 473	3 510	2 269	5 259	4 681	3 553	3 642	2 664	3 944	9 187	17 121	14 882	6 171	5 101	3 811	6 221	9 227	5 579	2 325
	Octopus vulgaris	14 819	10 520	12 476	7 175	14 826	9 204	10 623	2 382	2 794	4 825	6 881	9 328	3 418	4 522	8 723	5 904	4 317	9 602	1 187	988
	Triglidae spp.	6 735	4 117	5 293	5 245	6 403	3 335	4 181	3 094	4 042	3 788	3 893	4 196	3 012	3 224	3 871	3 778	4 348	6 497	2 193	713
	Scomber scombrus	3 094	1 130	4 365	2 865	4 423	1 972	103 361	178	308	5 629	4 007	981	365	785	480	541	984	558	182	202
OTB2	*Mullus* spp.	3 107	5 269	4 462	1 610	4 149	9 345	4 274	7 242	5 193	3 532	2 581	5 706	8 491	10 566	15 047	5 515	6 383	1 829	11 992	12 398
	Lophius spp.	5 270	5 676	5 714	4 747	13 615	14 965	8 438	10 245	14 457	13 040	7 878	11 165	18 154	10 734	6 947	5 101	5 215	4 578	7 878	8 428
	Merluccius merluccius	1 689	10 247	1 319	2 575	1 024	1 225	1 149	7 980	2 987	4 321	3 813	6 604	19 408	6 882	9 952	1 794	5 211	1 172	5 047	7 880
	Triglidae spp.	4 196	7 470	6 888	3 630	9 158	7 163	10 210	12 348	9 610	9 523	6 462	8 311	10 318	9 327	7 905	5 110	4 333	2 988	5 204	6 926
	Ommastrephidae spp.	737	717	281	392	279	711	3 435	2 440	2 696	6 628	2 287	6 390	8 733	2 501	4 680	504	2 548	1 199	2 886	5 387
	Eledone spp.	20 367	17 809	13 971	13 279	21 303	11 466	6 661	19 623	12 307	9 181	14 997	13 498	11 175	11 858	7 514	3 468	4 091	2 604	1 722	3 092
	Trisopterus spp.	1 450	1 324	1 255	1 188	5 037	4 179	2 997	3 027	2 396	2 977	2 744	4 827	9 966	3 492	3 678	1 441	2 176	2 360	2 226	1 963
	Octopus vulgaris	3 314	3 180	3 209	1 078	2 681	5 060	4 616	3 627	2 465	4 066	2 745	4 614	2 701	3 483	3 761	1 335	1 730	1 586	2 010	1 644
	Cepola macrophthalma	10 922	11 822	8 838	9 667	10 185	8 123	10 640	14 428	6 631	6 954	9 853	9 292	7 806	5 810	4 361	1 624	2 283	1 078	1 278	1 265
	Trachinus spp.	2 926	4 687	2 743	3 238	2 284	2 614	2 366	3 420	3 034	3 872	3 217	2 888	3 896	2 372	1 453	726	727	558	982	823
OTB3	*Parapenaeus longirostris*	356	471	0	0	0	0	79	605	1 191	1 100	1 112	852	1 838	3 173	14 258	10 113	9 984	11 443	13 971	17 479
	Phycis spp.	17 234	12 545	11 143	7 042	16 052	16 160	14 029	11 443	8 596	12 048	9 755	7 912	9 756	9 584	10 567	11 680	10 762	14 502	7 104	9 620
	Ommastrephidae spp.	2 895	3 491	2 144	3 431	3 279	1 973	5 457	4 870	5 115	8 252	1 691	3 627	3 962	1 785	3 017	1 109	4 827	1 772	2 639	7 804
	Merluccius merluccius	15 934	28 807	16 212	15 411	17 866	10 546	12 946	23 094	8 883	12 578	7 802	8 692	9 919	7 685	8 895	5 580	5 733	6 548	2 500	6 313
	Trachurus spp.	2 507	2 441	1 012	750	3 100	10 228	8 475	7 876	3 901	3 512	1 867	998	5 187	753	2 654	1 166	1 390	3 026	3 166	5 631
	Nephrops norvegicus	13 670	12 095	16 897	13 169	16 285	21 464	21 213	29 168	16 870	17 532	14 734	14 496	14 483	7 292	9 357	11 232	12 394	9 958	6 278	4 972
	Lophius spp.	10 155	11 041	6 662	6 983	10 968	12 612	13 400	8 554	5 862	6 128	4 494	4 847	3 662	4 329	4 113	3 029	3 281	3 311	2 801	3 269
	Eledone spp.	11 606	10 879	8 816	10 179	12 622	4 681	2 006	7 325	4 246	4 210	3 666	6 085	2 458	2 678	5 167	4 875	4 588	5 397	1 783	3 185
	Micromesistius poutassou	53 864	62 867	51 952	74 247	119 680	229 891	65 705	70 858	29 673	22 395	8 130	13 156	22 727	4 193	7 741	5 844	9 594	17 623	6 648	2 767
	Lepidorhombus spp.	2 071	2 470	1 423	3 134	5 347	4 824	4 898	4 617	3 489	2 318	2 685	3 030	2 001	3 460	3 787	2 650	2 346	1 998	1 772	1 989
OTB4	*Aristeus antennatus*	38 216	25 217	22 970	9 038	15 738	37 612	65 112	45 697	31 649	43 347	45 478	40 541	30 211	40 510	42 009	35 362	35 238	36 311	31 668	32 098
	Gambes varies	32	2 756	2 669	868	1 279	2 361	2 946	4 250	2 002	2 285	2 303	2 313	2 415	2 777	2 952	3 149	2 253	3 335	3 339	3 083
	Phycis spp.	3 463	3 275	3 129	1 638	2 716	4 517	4 583	3 310	2 922	4 293	3 528	4 168	5 025	4 042	3 088	3 652	2 411	4 503	2 887	3 033
	Merluccius merluccius	3 861	4 871	3 623	1 230	1 895	3 208	2 572	3 249	2 151	4 604	2 517	4 699	3 280	2 637	1 986	2 061	1 391	2 720	2 526	2 340
	Lophius spp.	1 256	1 349	1 226	748	1 050	1 750	2 519	1 410	1 198	1 395	1 268	1 895	1 787	1 571	1 331	1 259	797	1 112	1 323	1 066
	Ommastrephidae spp.	290	202	195	302	354	521	391	349	644	929	466	626	341	379	216	213	548	279	256	485
	Taurons	129	253	397	212	238	286	197	287	309	387	180	279	358	422	347	699	170	324	635	417
	Micromesistius poutassou	3 933	3 834	2 704	2 365	2 621	12 055	9 300	26 680	3 248	3 852	1 219	1 516	827	1 745	809	478	357	1 340	990	386
	Nephrops norvegicus	934	1 375	617	503	915	1 483	1 778	852	809	1 018	998	869	490	1 121	245	327	581	758	425	382
	Conger conger	299	317	316	160	340	565	655	433	391	324	444	392	393	395	455	578	244	213	147	266

Table 35. Species composition and landings (in kg) by *métier* for Barcelona.

		Center																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1	*Mullus* spp.	27 120	30 716	24 921	19 826	19 851	31 180	18 111	30 978	28 793	46 027	34 401	39 660	29 727	27 747	39 678	36 926	25 824	32 584	36 648	19 435
	Trachurus spp.	8 962	11 916	14 252	13 596	12 570	16 406	21 422	116 987	30 631	124 180	35 287	32 384	60 839	22 031	19 807	22 024	14 078	22 110	23 068	15 302
	Pagellus acarne	11 889	19 841	15 131	9 609	8 749	9 975	11 355	24 450	22 261	159 230	29 753	29 896	20 035	9 946	10 315	8 909	11 268	12 981	18 175	9 974
	Pagellus erythrinus	3 535	5 503	5 534	5 072	5 285	5 121	7 428	11 742	16 062	32 111	18 994	27 484	22 318	15 100	15 892	15 607	10 927	12 146	15 086	8 793
	Merluccius merluccius	11 629	29 313	21 157	14 310	11 071	16 654	23 010	29 584	18 915	62 934	36 883	33 362	27 475	18 085	26 145	21 553	8 811	8 646	8 661	8 708
	Sparus aurata	515	1 296	3 153	1 459	3 325	2 586	4 526	5 152	4 422	16 495	7 832	5 777	7 453	4 681	2 294	3 924	14 475	4 918	1 147	5 063
	Loligo spp.	3 142	7 715	8 889	7 098	5 051	3 940	5 531	8 916	6 227	26 918	13 846	17 296	17 571	4 122	6 614	3 808	4 899	2 439	3 423	4 971
	Lophius spp.	7 542	9 181	6 162	3 200	2 890	8 783	5 011	9 102	8 949	10 387	9 141	10 479	10 295	4 987	7 019	5 182	2 715	7 634	4 912	1 886
	Octopus vulgaris	3 772	2 356	2 812	3 143	3 710	4 838	3 556	3 649	3 853	4 323	6 163	17 614	6 602	7 352	9 764	6 031	3 646	5 786	2 108	1 507
	Eledone spp.	8 294	11 530	16 295	11 676	4 698	12 908	3 401	18 518	12 352	18 329	19 921	11 739	5 802	2 675	4 410	3 762	559	4 339	2 115	1 167
OTB2	*Trachurus* spp.	351	337	202	2 651	9 548	107	6 920	90	45 286	1 152	129	1 833	20 901	795	22	111	16 351	11 676	9 914	16 138
	Mullus spp.	5 443	7 788	3 149	1 823	9 550	31	4 225	1 662	12 053	1 122	181	7 143	7 644	4 958	4 179	3 512	26 714	9 087	7 168	10 844
	Ommastrephidae spp.	964	78	186	263	135	425	2 169	1 065	2 768	481	488	2 051	5 293	288	469	39	17 958	1 213	4 568	9 270
	Merluccius merluccius	7 869	4 669	7 007	10 280	20 384	4 976	6 729	10 875	15 120	3 193	4 769	14 195	18 267	5 558	993	1 134	16 534	7 360	4 980	9 241
	Phycis spp.	80	9	29	59	84	8 764	13	17 584	8 709	410	9 996	241	6 682	129	6	5	5 863	6 756	3 864	6 069
	Nephrops norvegicus	12	2	4	10	18	394	28	8 327	8 979	229	7 120	187	11 089	67	0	0	6 041	3 690	3 536	3 933
	Micromesistius poutassou	1 788	4	31	341	324	22 288	46	37 507	16 143	4 721	4 273	133	21 383	25	0	0	3 772	9 433	4 096	3 268
	Lophius spp.	8 088	5 248	4 858	3 433	7 390	2 014	2 867	3 340	4 006	1 226	2 982	7 265	6 180	4 659	1 955	3 055	8 683	3 112	2 660	2 503
	Aristeus antennatus	19	18	133	5	64	20 415	30	31 097	2 579	44 759	33 109	170	177	13	0	0	159	56	263	1 765
	Eledone spp.	19 895	16 097	22 020	14 943	20 976	109	8 547	1 727	4 410	227	1 267	12 094	2 903	3 902	2 895	2 554	5 533	2 825	1 024	1 220
OTB3	*Parapenaeus longirostris*	391	490	1 097	1 031	368	17	199	622	1 649	884	1 763	2 311	3 396	4 698	17 507	10 157	9 225	15 661	13 054	19 267
	Phycis spp.	11 023	10 731	9 632	11 695	19 291	15 194	19 905	12 546	10 504	15 507	15 454	14 158	12 449	12 734	13 316	10 346	10 484	18 982	8 513	12 205
	Merluccius merluccius	8 473	20 364	15 683	21 685	26 701	12 097	19 426	22 238	16 187	26 806	26 127	27 509	18 707	15 935	14 302	11 803	10 634	14 306	6 215	11 964
	Nephrops norvegicus	7 180	10 502	10 413	12 376	14 909	16 584	21 982	18 846	16 469	15 424	24 252	24 699	22 163	16 564	14 831	9 430	14 530	16 806	9 175	8 564
	Micromesistius poutassou	30 373	28 513	34 462	55 250	95 941	79 321	61 765	33 952	31 781	190 342	19 966	30 349	17 463	7 127	11 805	9 807	6 604	18 678	13 286	8 418
	Ommastrephidae spp.	1 059	1 176	971	2 959	1 668	1 105	5 359	4 858	6 480	14 044	3 747	6 749	2 634	1 809	5 382	722	2 312	859	2 499	7 610
	Lophius spp.	4 174	7 161	6 012	8 071	8 670	7 430	9 757	6 962	6 209	5 956	8 509	8 885	3 457	4 623	4 600	1 503	2 197	2 638	1 821	3 387
	Trachurus spp.	116	1 958	2 031	6 133	6 601	7 880	26 802	11 050	5 389	79 219	10 584	7 861	274	5 645	231	414	245	810	871	1 474
	Eledone spp.	5 225	7 297	8 274	12 046	11 138	6 799	5 055	6 659	5 162	6 755	7 855	10 697	2 631	3 093	4 613	2 756	2 948	5 875	959	1 191
	Mullus spp.	1 112	5 714	5 832	5 691	5 937	4 771	7 255	5 211	1 277	13 922	6 950	7 642	151	658	771	47	210	312	44	341
OTB4	*Aristeus antennatus*	24 058	17 542	18 921	16 246	11 676	18 757	43 277	30 754	47 417	39 252	62 674	74 572	33 749	69 126	63 269	38 607	38 896	39 749	41 542	32 620
	Phycis spp.	7 975	8 178	5 179	6 450	4 081	3 862	9 144	6 884	13 189	19 299	3 741	14 414	6 385	8 511	6 141	5 441	5 607	8 041	5 362	5 325
	Gambes varies	3 590	3 885	4 225	2 536	1 521	1 188	2 751	5 045	3 794	3 168	2 363	5 209	2 554	5 432	3 723	3 271	1 805	4 444	4 141	3 193
	Merluccius merluccius	2 968	3 625	3 287	3 733	2 201	1 882	3 283	5 618	6 313	8 340	1 746	6 565	2 538	3 745	1 981	1 430	1 472	2 514	1 759	1 739
	Lophius spp.	2 228	2 105	2 048	1 570	1 191	1 175	3 057	1 832	2 704	2 553	458	4 838	3 123	3 562	2 404	1 626	1 363	1 692	2 057	1 718
	Necora puber	0	0	0	0	0	0	0	0	968	597	1 709	1 651	994	1 050	1 086	738	1 158	1 511	1 794	1 430
	Micromesistius poutassou	6 420	3 373	3 809	3 838	3 949	487	14 966	443	10 892	10 704	99	6 303	2 296	4 054	1 521	450	782	1 132	1 709	1 095
	Taurons	783	670	1 134	962	383	74	647	1 005	1 375	531	513	1 273	585	807	910	735	395	943	1 069	922
	Conger conger	770	642	567	443	575	586	1 652	856	991	943	969	1 292	364	907	796	586	718	929	628	516
	Nephrops norvegicus	1 074	624	357	76	62	373	742	1 488	2 125	6 361	308	6 357	537	2 804	85	106	280	167	258	240

Table 36. Species composition and landings (in kg) by *métier* for Tarragona.

		Center																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1	*Mullus* spp.	24 623	23 425	20 639	19 940	36 183	32 818	17 820	19 228	15 098	22 148	14 353	16 690	19 193	22 316	50 778	30 385	25 265	32 038	27 713	23 886
	Eledone spp.	12 779	11 500	10 504	14 466	26 179	16 871	23 330	20 603	5 167	13 968	13 147	19 274	12 782	43 599	91 136	21 438	15 517	47 418	10 395	20 267
	Ommastrephidae spp.	2 122	1 030	346	544	644	1 217	13 192	3 528	718	8 934	2 953	3 340	5 829	6 724	45 267	5 628	11 815	16 460	3 759	19 095
	Citharus linguatula	7 802	8 575	5 165	4 406	10 143	10 827	11 882	8 392	2 432	5 822	4 052	3 933	3 863	12 569	24 666	8 955	11 633	19 734	4 876	12 833
	Merluccius merluccius	25 614	51 378	15 743	27 638	92 017	25 183	59 829	32 283	5 481	21 537	9 079	13 793	11 886	28 082	41 601	12 204	19 805	21 369	7 035	12 453
	Pagellus erythrinus	8 210	11 587	8 699	9 045	11 241	12 852	10 320	8 447	6 299	11 859	3 487	9 587	9 388	10 839	18 394	11 000	6 984	9 523	6 551	9 651
	Pagellus acarne	12 201	12 848	13 952	9 080	10 568	12 408	6 342	8 733	6 736	11 554	5 994	4 226	8 297	4 326	4 328	7 245	6 283	5 717	8 716	8 770
	Trachurus spp.	18 631	17 701	10 811	11 623	32 118	41 467	46 128	14 152	15 659	17 209	5 754	9 866	25 596	13 928	20 145	14 603	8 109	14 410	12 092	7 683
	Loligo spp.	16 346	12 162	12 263	14 246	17 208	12 910	8 102	7 899	2 569	7 520	8 275	6 274	5 853	3 386	4 909	2 185	2 568	1 862	2 424	3 953
	Octopus vulgaris	11 291	9 361	12 174	19 191	17 474	13 276	13 489	9 214	9 366	9 206	2 857	5 311	4 985	7 324	9 909	6 118	4 492	11 402	3 655	3 891
OTB2	*Ommastrephidae* spp.	7 778	5 426	8 553	8 155	2 182	8 904	30 168	23 935	49 773	74 932	41 863	49 159	66 761	12 739	38 391	12 493	23 998	11 321	43 738	34 579
	Eledone spp.	65 961	48 409	110 214	106 881	80 146	61 055	38 203	93 831	120 237	85 802	123 793	164 375	95 058	58 665	30 873	55 649	25 927	18 012	41 719	15 031
	Merluccius merluccius	55 401	59 543	76 649	68 822	59 700	39 049	94 324	89 405	71 183	63 378	73 718	73 056	40 663	23 945	41 711	16 900	9 776	7 487	18 110	9 616
	Trisopterus spp.	17 288	13 924	17 076	30 235	40 850	34 723	9 007	14 519	16 368	18 472	30 574	30 816	17 582	16 706	11 330	16 689	9 743	7 523	11 156	4 660
	Citharus linguatula	18 473	14 148	19 087	15 290	13 270	17 666	15 587	17 737	16 428	16 586	18 692	19 631	13 405	8 098	1 792	14 648	8 197	2 484	9 887	4 557
	Trachurus spp.	5 726	5 638	14 780	35 203	17 628	49 024	35 066	34 900	33 570	20 556	20 371	17 237	18 236	10 847	7 217	14 051	3 740	14 900	27 845	4 482
	Cepola macrophthalma	20 758	16 289	17 011	20 287	21 552	13 866	7 708	11 588	11 047	8 536	5 728	5 005	4 873	1 813	322	1 831	400	3 893	13 804	3 736
	Lophius spp.	5 619	6 405	11 763	14 342	22 523	14 981	5 126	22 149	24 013	16 177	14 052	30 410	21 455	8 768	9 980	11 827	7 389	5 104	15 088	2 323
	Gobidae	56 853	62 072	69 684	68 354	57 696	54 136	48 301	10 927	6 880	5 912	5 526	8 260	7 219	3 412	436	5 458	2 615	377	2 723	94
	Osteichthyes	0	0	0	0	76	19	5	39 022	39 039	38 376	43 530	36 950	30 974	22 486	6 116	18 480	11 634	0	0	0
OTB3	*Parapenaeus longirostris*	2 149	1 916	0	294	1 122	506	1 338	3 614	2 304	3 186	2 999	2 719	3 815	2 958	1 563	1 697	29 399	22 298	19 650	45 000
	Ommastrephidae spp.	7 768	7 204	7 170	8 814	3 579	4 464	19 129	11 944	20 817	27 239	13 634	11 460	39 324	7 651	10 018	9 247	34 703	3 408	6 155	43 080
	Merluccius merluccius	58 466	78 950	65 761	94 944	88 105	48 450	33 015	55 476	32 522	31 216	45 928	48 056	67 907	45 364	44 014	41 193	49 686	36 798	14 845	41 707
	Micromesistius poutassou	163 023	99 958	92 977	109 290	195 956	169 103	98 013	64 120	69 503	77 050	41 342	49 669	57 188	21 673	23 183	22 991	19 533	27 596	10 622	19 977
	Phycis spp.	18 782	18 333	13 632	22 006	25 527	22 637	13 989	12 221	11 102	13 916	11 520	20 411	15 573	18 712	16 663	10 433	19 401	13 525	8 264	15 095
	Nephrops norvegicus	49 911	27 269	43 670	47 859	57 868	49 466	30 874	43 870	35 606	27 439	34 375	44 511	36 721	19 999	21 475	15 492	14 131	17 369	11 302	12 507
	Eledone spp.	46 557	28 878	34 065	40 068	25 440	21 436	13 390	18 235	36 554	24 235	32 157	25 939	36 790	23 470	16 912	19 762	28 753	14 246	8 379	11 640
	Lophius spp.	21 294	19 571	18 088	30 900	35 824	26 784	14 699	12 104	18 036	17 887	21 871	21 832	25 603	16 695	11 007	13 515	15 792	9 017	4 526	10 633
	Gambes varies	11 710	7 361	6 752	2 733	818	366	1 309	2 405	4 062	3 785	7 542	7 732	17 430	15 061	23 937	29 162	11 137	2 463	2 641	4 122
	Trisopterus spp.	9 530	9 824	5 333	9 796	18 316	12 894	4 083	4 598	8 803	11 174	17 299	9 838	17 239	4 636	1 344	4 805	6 896	932	269	2 602
OTB4	*Aristeus antennatus*	0	0	27 201	12 388	23 362	43 137	63 268	58 039	89 384	82 811	89 195	73 075	49 907	47 286	31 052	41 799	60 980	44 004	29 948	24 428
	Phycis spp.	9 006	8 311	3 792	2 794	2 562	10 755	14 565	12 889	13 682	12 998	15 191	16 892	13 618	13 015	12 208	11 768	9 006	13 800	9 616	7 729
	Merluccius merluccius	11 015	18 537	4 694	3 035	1 297	17 642	16 825	20 071	14 877	17 217	11 933	14 294	13 480	8 396	5 334	7 828	12 002	9 019	5 441	6 201
	Taurons	3 404	4 100	4 201	2 301	1 534	3 697	3 888	5 955	5 172	3 683	7 776	6 858	4 963	5 116	6 850	4 799	4 139	5 298	4 297	5 288
	Micromesistius poutassou	10 812	4 649	2 843	2 490	1 209	28 879	41 900	13 576	16 920	6 429	6 059	4 786	5 289	5 393	4 772	2 406	2 713	1 923	3 834	2 332
	Liocarcinus depurator	0	0	0	0	0	0	748	925	2 039	397	802	2 165	3 801	3 867	6 262	4 276	3 599	5 917	9 431	2 178
	Lophius spp.	3 019	2 741	1 986	1 496	1 108	4 799	5 396	4 864	5 015	4 408	7 110	6 025	5 362	3 237	2 494	2 347	2 411	2 522	2 681	2 078
	Ommastrephidae spp.	762	948	474	591	383	985	4 293	1 387	2 639	1 938	1 412	2 193	2 213	1 950	2 158	1 517	2 493	2 079	1 356	1 551
	Nephrops norvegicus	6 961	11 511	2 222	134	45	7 244	14 822	14 200	22 755	22 838	16 104	14 725	11 500	6 438	2 262	3 412	5 778	2 878	3 910	1 332
	Parapenaeus longirostris	36 590	27 414	0	42	831	863	1 456	9 337	6 353	4 691	6 826	6 240	4 185	6 826	3 791	7 194	1 475	5 987	6 567	521

Table 37. Species composition and landings (in kg) by *métier* for Vilanova i la Geltrú.

		Center																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Mullus spp.	64 140	52 081	53 117	31 002	60 190	54 330	32 834	40 270	33 179	46 499	32 817	38 855	39 111	39 821	59 504	55 589	34 115	47 113	54 717	31 427
	Pagellus acarne	40 779	34 153	34 591	24 419	37 626	33 771	38 734	28 522	23 612	29 681	20 850	23 519	31 962	32 530	22 716	27 193	20 276	26 824	33 420	24 425
	Trachurus spp.	32 719	30 804	37 255	22 798	58 977	22 138	32 746	39 993	29 653	42 495	7 540	22 163	18 812	20 339	15 069	20 273	13 522	22 460	40 479	21 581
	Pagellus erythrinus	13 103	11 328	11 376	10 427	12 600	14 685	14 344	10 009	10 335	21 318	9 969	17 874	14 370	16 923	13 703	14 566	11 442	17 491	18 610	15 157
OTB1	*Loligo* spp.	23 999	20 073	17 695	9 732	14 779	8 233	11 033	11 997	9 216	19 364	10 292	15 928	8 804	3 222	6 049	4 146	2 459	2 254	3 682	7 816
	Merluccius merluccius	62 864	76 947	38 889	9 942	27 045	7 379	11 597	13 017	5 813	13 916	1 893	8 859	3 964	4 108	4 014	5 117	4 834	4 010	12 051	7 141
	Octopus vulgaris	43 525	22 374	15 977	23 277	20 852	20 705	14 244	12 227	9 106	17 685	12 797	13 282	9 504	12 264	11 436	7 519	5 820	5 887	7 693	4 559
	Sepia officinalis	14 625	19 589	12 212	9 283	17 040	13 337	8 086	15 772	8 821	9 462	1 919	5 062	3 123	4 584	5 554	4 170	4 855	5 629	4 517	2 454
	Eledone spp.	26 743	30 197	29 997	12 823	18 359	8 652	4 347	11 414	6 774	12 127	1 453	10 391	2 568	3 014	4 762	4 576	1 762	2 564	9 716	1 726
	Osteichthyes	25 825	23 429	17 950	8 421	12 788	8 914	6 746	7 497	4 446	8 111	2 296	3 776	4 527	4 649	4 411	3 691	724	0	0	0
	Merluccius merluccius	15 109	14 730	35 451	67 277	57 415	29 529	90 539	70 101	41 329	31 167	57 891	25 008	21 149	15 894	13 663	10 058	20 476	13 306	2 450	6 299
	Mullus spp.	2 035	2 421	4 751	12 378	7 111	13 436	10 543	6 884	10 779	2 271	19 810	9 718	10 446	13 227	17 008	14 221	22 709	14 789	312	4 773
	Ommastrephidae spp.	0	0	0	0	0	0	0	13 492	19 304	27 946	19 071	11 048	20 186	3 854	10 427	2 784	8 315	5 694	8 002	4 029
	Trachurus spp.	504	451	1 540	50 921	32 016	81 000	110 147	110 919	71 965	12 160	40 146	19 205	29 033	13 445	14 518	12 323	16 444	22 578	11 299	4 014
OTB2	*Lophius* spp.	4 423	4 386	8 822	11 385	14 059	8 679	10 014	24 759	20 397	10 135	16 910	22 382	24 925	9 877	12 659	10 352	9 748	13 814	2 320	3 438
	Eledone spp.	29 203	24 416	55 684	59 155	41 706	26 332	26 131	49 531	35 683	20 262	55 754	44 959	25 253	20 882	15 140	11 222	12 602	11 450	1 353	3 117
	Citharus linguatula	14 091	13 403	17 357	15 279	9 185	10 836	11 006	7 094	5 804	3 722	9 462	7 057	4 709	5 333	4 739	4 184	5 142	4 553	74	2 827
	Trisopterus spp.	2 681	3 359	2 771	13 794	19 284	12 552	11 014	9 908	6 787	5 007	21 463	9 304	13 801	6 657	8 825	6 499	5 519	9 234	666	1 125
	Scomber scombrus	83	1 156	3 496	23 985	25 750	26 051	27 768	8 991	5 060	10 570	8 978	1 875	403	1 464	586	451	2 738	651	0	701
	Osteichthyes	9 201	10 530	13 446	19 314	18 325	13 516	33 339	15 692	10 537	6 507	15 485	7 942	9 833	8 597	6 657	5 570	1 281	0	0	0
	Parapenaeus longirostris	0	0	0	0	0	51	154	162	1 334	1 377	898	1 401	3 621	4 475	15 003	12 184	16 090	12 696	21 242	28 024
	Ommastrephidae spp.	0	0	0	0	0	0	0	6 231	15 481	30 542	3 382	10 219	5 140	2 421	9 276	3 537	15 418	1 921	3 118	22 614
	Merluccius merluccius	33 460	37 533	35 858	65 346	61 743	35 904	32 745	36 556	24 925	37 975	19 050	26 613	22 408	13 182	13 567	13 228	19 175	13 352	5 463	13 789
	Phycis spp.	18 720	11 521	13 823	15 735	22 764	24 861	17 380	13 617	15 698	15 343	12 822	13 521	10 787	13 324	13 155	14 483	18 326	18 076	8 016	13 698
OTB3	*Nephrops norvegicus*	16 707	11 129	19 511	21 340	24 812	28 526	24 686	35 370	34 767	26 412	29 997	27 658	20 375	12 767	10 971	12 197	13 180	12 790	8 053	8 336
	Eledone spp.	30 535	13 687	28 047	37 068	27 922	23 091	14 263	17 131	19 122	19 969	12 453	23 233	8 705	13 443	13 712	13 196	18 554	14 186	5 357	8 071
	Trachurus spp.	4 220	851	4 658	5 422	9 568	23 802	20 976	1 403	2 413	8 180	194	1 666	1 866	6 742	2 895	9 422	6 345	4 564	1 893	7 737
	Micromesistius poutassou	106 822	59 049	80 541	110 891	220 134	238 518	107 316	44 478	44 563	61 408	7 946	26 978	15 201	7 766	11 189	8 363	11 331	11 257	6 547	7 163
	Lophius spp.	15 690	10 478	15 110	19 175	22 000	22 952	16 943	11 247	16 069	17 917	10 802	16 132	10 627	10 798	9 141	9 967	12 951	7 508	3 838	6 598
	Osteichthyes	17 833	11 450	16 340	26 207	21 680	19 937	29 756	7 728	9 027	9 935	5 257	7 866	4 715	5 398	6 590	7 560	652	0	0	0
	Aristeus antennatus	37 412	32 515	20 104	11 438	12 867	28 416	55 990	43 086	45 298	57 892	57 932	52 318	37 260	54 142	42 306	46 008	53 522	42 850	54 038	39 349
	Phycis spp.	9 342	10 460	5 372	4 972	1 653	7 457	9 379	12 050	8 929	10 885	10 360	11 410	9 641	10 476	9 494	9 716	8 619	11 928	7 489	6 808
	Gambes varies	0	0	0	0	0	2 704	3 096	6 263	3 197	4 260	4 956	3 789	3 196	5 999	3 584	4 211	2 638	4 592	5 644	4 169
	Merluccius merluccius	5 975	6 257	3 837	3 047	1 048	6 918	5 750	9 809	6 868	10 995	6 195	6 194	7 017	4 443	3 570	4 141	4 646	6 445	3 959	2 587
	Taurons	1 856	2 239	1 934	818	570	1 395	1 628	2 972	2 104	2 366	2 962	2 663	2 474	2 003	2 121	1 855	1 145	2 480	1 925	2 390
OTB4	*Lophius* spp.	3 102	3 671	1 700	1 352	953	3 009	4 159	4 236	3 176	4 126	3 160	3 793	3 701	3 717	2 402	2 357	2 002	2 316	2 470	1 833
	Conger conger	1 501	1 302	958	755	599	2 242	2 820	3 104	2 320	2 353	2 440	2 322	2 256	2 436	2 299	1 851	1 753	2 183	1 053	1 726
	Micromesistius poutassou	7 553	6 592	2 556	2 276	324	12 687	17 577	6 874	4 301	4 992	2 104	2 032	2 136	2 676	2 325	1 043	1 372	1 344	1 042	791
	Nephrops norvegicus	2 478	2 026	629	35	174	1 795	2 456	2 978	4 671	5 777	1 968	1 972	1 211	1 177	567	876	1 208	1 238	1 666	555
	Osteichthyes	3 534	3 628	1 847	2 285	504	2 887	1 927	582	382	502	459	308	259	230	131	333	24	0	0	0

Table 38. Species composition and landings (in kg) by *métier* for Cambrils.

		South																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1A	*Mullus* spp.	5 030	15 915	21 225	15 345	25 914	33 481	7 558	8 310	7 018	8 918	13 882	15 701	29 372	20 627	13 237	9 506	23 391	25 595	21 901	17 486
	Pagellus erythrinus	2 652	17 637	15 549	15 634	16 322	26 404	8 423	8 107	6 296	9 644	9 778	13 197	21 550	19 834	8 548	5 049	16 493	13 729	9 789	11 413
	Merluccius merluccius	4 171	23 730	42 449	14 625	28 965	18 768	5 205	3 771	2 387	1 760	6 135	12 294	10 376	13 520	3 925	3 692	20 858	13 378	8 040	10 882
	Pagellus acarne	3 638	8 547	19 176	13 190	13 920	9 552	1 863	3 966	6 245	6 609	9 187	9 212	19 259	9 873	2 497	2 196	6 875	11 190	8 120	6 750
	Eledone spp.	1 317	1 053	13 360	1 733	8 273	2 344	1 983	3 514	1 900	841	7 677	18 654	13 813	12 009	7 209	4 978	1 788	15 517	14 213	6 101
	Trachurus spp.	7 870	22 576	21 751	17 510	33 758	45 272	8 483	7 154	6 446	7 156	4 833	16 342	19 199	13 526	5 849	6 703	13 754	15 095	16 177	5 661
	Squilla mantis	4 816	23 917	22 237	11 756	20 438	15 110	2 377	2 936	2 002	1 732	3 142	7 795	4 759	3 815	12 880	7 549	8 190	7 023	10 531	5 554
	Sparus aurata	1 272	14 775	8 491	10 770	24 857	46 581	8 236	2 603	4 117	5 673	5 165	7 324	8 204	6 895	2 274	636	16 291	1 278	853	2 595
	Octopus vulgaris	6 688	17 602	18 874	22 157	30 762	29 424	7 747	5 942	5 992	7 058	8 346	5 874	10 119	9 488	6 341	6 345	7 767	2 657	2 849	2 572
	Osteichthyes	431	17 437	18 261	8 110	48 978	15 816	1 766	82	227	2 184	134	8 069	10 306	9 115	4 877	4 081	44	0	0	0
OTB1B	*Trachurus* spp.	12 892	2 465	62 471	150 961	154 120	160 173	106 611	79 448	36 796	52 248	17 749	8 183	3 630	3 945	20 527	8 105	20 560	15 631	7 691	12 394
	Ommastrephidae spp.	1 059	1 047	2 597	5 068	3 983	8 957	15 057	10 614	12 683	29 642	8 420	2 161	2 691	4 895	27 359	4 629	22 958	5 506	9 212	6 119
	Mullus spp.	15 731	3 917	6 909	12 130	21 350	17 617	11 048	12 875	13 464	15 005	9 154	3 316	3 913	6 392	27 766	15 548	9 926	9 398	14 753	4 390
	Eledone spp.	2 161	9 689	22 071	38 088	61 424	27 549	22 787	26 745	39 854	37 488	21 822	13 779	14 045	16 674	25 563	4 519	18 737	5 479	12 076	4 059
	Merluccius merluccius	17 595	13 824	31 098	62 230	68 789	32 076	35 820	73 670	36 581	48 290	24 930	8 346	7 310	15 518	34 641	8 587	15 701	13 176	15 175	2 941
	Scomber scombrus	2 140	3 055	41 300	83 754	162 492	49 009	69 878	11 732	7 017	12 523	7 549	716	455	1 372	9 212	2 541	1 032	3 777	2 719	1 722
	Trisopterus spp.	6 332	11 217	14 794	38 279	64 886	44 597	15 470	26 954	22 908	34 936	19 428	10 181	12 657	8 942	15 885	3 451	14 108	10 038	3 866	1 481
	Squilla mantis	18 212	14 580	2 785	3 829	3 727	1 316	3 629	21 714	18 714	13 850	6 140	7 121	6 548	8 092	10 934	3 080	12 563	10 330	3 666	1 273
	Lophius spp.	240	2 997	5 763	14 786	35 881	17 179	6 685	12 899	10 168	9 398	5 560	5 936	2 986	3 232	12 696	3 504	7 513	3 475	4 004	633
	Osteichthyes	18 537	16 564	12 096	23 371	82 186	21 041	37 530	13 995	11 619	4 129	157	81	5 785	7 326	14 220	4 194	2 094	0	0	0
OTB2A	*Trachurus* spp.	4 062	8 119	5 262	21 758	13 236	61 079	53 956	8 859	28 525	8 247	12 635	22 332	46 841	42 357	14 112	18 470	11 669	66 423	35 999	36 035
	Merluccius merluccius	44 120	41 971	14 439	43 853	0	27 174	229 061	54 877	106 230	43 740	79 681	83 958	41 464	21 377	18 894	25 843	75 263	38 438	8 658	23 705
	Ommastrephidae spp.	7 069	2 020	787	1 488	617	2 617	59 057	19 478	79 052	23 859	58 206	36 490	43 646	18 929	10 614	8 503	45 644	23 147	5 138	19 577
	Eledone spp.	39 525	4 175	5 131	19 361	21 111	19 935	24 733	32 770	71 062	18 740	55 949	69 102	33 541	20 454	16 146	23 313	16 014	29 272	11 491	17 960
	Mullus spp.	7 810	10 252	3 414	10 112	9 009	19 140	3 793	7 038	13 338	10 133	19 298	21 225	11 876	13 412	7 400	13 064	22 434	22 375	7 752	12 023
	Trisopterus spp.	16 324	1 099	6 906	22 689	6 828	3 647	12 651	5 495	35 975	8 517	18 258	30 628	18 670	19 464	8 943	17 229	13 161	19 664	5 471	7 094
	Lophius spp.	9 839	520	2 366	3 845	9 681	2 235	6 037	6 120	28 285	4 440	5 014	21 782	12 735	9 761	6 723	8 764	13 743	19 698	6 019	6 325
	Pagellus erythrinus	2 231	8 412	1 487	5 802	7 483	14 022	4 603	13 022	4 494	14 964	14 581	24 521	16 692	6 777	1 086	5 651	8 335	4 933	1 229	2 467
	Scomber scombrus	6 581	3 181	2 923	10 943	0	9 739	22 365	6 668	7 135	9 410	33 233	26 794	7 805	5 805	4 445	4 009	469	4 579	1 744	1 614
	Osteichthyes	433	19 047	12 114	18 832	60 384	32 672	6 648	26	166	201	1 762	18 813	11 048	12 904	5 187	10 418	857	0	0	0
OTB2B	*Ommastrephidae* spp.	9 462	10 401	14 200	10 045	2 252	2 508	30 030	41 917	16 204	104 414	33 252	55 202	85 217	14 363	47 196	18 195	10 656	526	36 793	40 234
	Merluccius merluccius	76 795	116 184	115 504	96 519	62 357	15 648	78 532	149 867	35 759	103 739	113 930	105 075	77 959	78 391	78 333	42 285	17 019	1 882	31 259	25 362
	Eledone spp.	48 949	44 590	105 188	77 618	30 096	17 535	18 764	69 097	45 886	59 345	65 829	69 843	49 512	45 341	30 438	24 860	5 472	1 688	14 705	12 249
	Mullus spp.	13 164	14 134	11 877	10 533	6 965	7 769	8 607	5 077	4 133	6 733	13 074	12 108	13 884	13 592	16 909	21 274	1 098	582	13 186	7 188
	Trisopterus spp.	29 502	22 862	19 843	30 921	20 652	3 562	17 134	22 888	8 113	37 405	47 155	43 024	30 194	16 167	16 022	16 617	2 572	287	5 660	7 122
	Trachurus spp.	20 192	18 182	6 395	8 571	13 037	675	28 598	12 863	4 156	4 818	15 325	7 651	20 483	8 071	3 087	23 699	4 638	4 270	8 273	4 531
	Scomber scombrus	71 565	57 939	28 622	25 550	12 322	4 511	10 327	6 228	3 508	16 998	12 720	4 832	3 270	15 454	5 308	3 865	26	46	2 468	4 450
	Lophius spp.	7 016	13 038	17 369	18 393	8 412	8 966	3 759	25 039	14 785	29 605	27 206	40 584	36 935	16 353	20 627	16 199	3 599	1 061	9 888	4 233
	Engraulis encrasicolus	25 686	24 219	48 710	23 479	30 541	16 950	1 810	13 757	151	27 123	14 192	9 202	10 186	1 014	732	2 535	132	50	222	73
	Osteichthyes	46 893	44 813	51 072	29 644	13 105	18 830	450	475	140	454	1 511	11 610	17 502	12 504	10 402	11 517	2	0	0	0

Table 39. Species composition and landings (in kg) by *métier* for L'Ametlla de Mar.

		South																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1A	*Mullus* spp.	38 862	32 533	33 885	33 975	35 616	39 759	16 400	15 920	26 054	16 913	14 810	25 780	24 466	12 691	48 853	34 669	40 518	34 398	48 158	22 813
	Squilla mantis	25 345	39 312	28 491	25 583	26 199	37 701	21 174	14 415	28 786	4 846	5 463	25 664	30 224	3 560	25 081	8 230	43 990	42 724	33 576	22 152
	Sepia officinalis	4 474	8 649	4 525	5 632	7 288	16 957	7 592	7 421	6 850	5 800	7 360	11 237	10 808	4 129	13 159	4 229	2 027	15 224	16 811	9 296
	Merluccius merluccius	5 490	6 339	7 137	14 232	10 424	13 897	9 064	2 430	6 200	1 759	1 075	7 842	3 061	1 730	6 128	3 891	11 914	11 093	6 317	9 225
	Sparus aurata	16 441	18 509	17 010	12 275	20 164	46 618	20 062	14 985	22 301	32 083	17 374	31 820	28 927	11 351	25 571	13 638	26 923	7 890	15 054	7 392
	Octopus vulgaris	17 948	9 964	11 316	22 547	13 317	35 059	12 882	10 705	18 567	10 286	9 570	14 859	12 240	5 949	25 181	10 409	14 652	15 144	11 833	5 995
	Pagellus erythrinus	4 768	7 357	5 068	8 412	8 687	18 249	7 163	5 768	10 873	9 545	7 699	18 454	15 019	10 302	32 240	11 827	28 666	18 071	19 843	5 970
	Trachurus spp.	5 459	6 122	9 197	8 695	8 087	24 307	7 214	3 715	7 641	6 394	4 185	14 576	18 703	10 660	24 857	20 515	23 503	22 929	30 813	4 859
	Conger conger	10 449	17 150	8 410	15 360	12 615	15 097	4 514	4 103	7 041	1 455	2 127	5 281	5 466	1 931	4 607	2 574	7 342	7 506	6 032	3 634
	Mugilidae spp.	13 714	13 074	10 509	10 242	5 538	7 194	2 869	2 082	4 310	3 108	1 253	3 672	5 192	6 973	9 957	10 404	10 718	11 313	7 651	1 799
OTB1B	*Mullus* spp.	9 635	15 053	3 192	12 369	14 906	7 964	9 573	12 382	11 991	22 625	16 595	2 564	14 056	11 981	9 240	18 224	13 957	22 447	26 293	29 711
	Trachurus spp.	5 373	7 582	953	10 489	14 728	17 012	14 453	18 123	9 838	14 458	6 413	3 297	9 466	1 823	1 704	4 089	21 192	28 051	15 871	26 107
	Squilla mantis	9 321	10 836	18 579	17 117	10 180	2 611	10 001	20 909	8 178	23 695	24 256	22 087	17 677	32 524	1 956	40 209	30 664	8 247	16 321	5 975
	Scomber scombrus	5 847	7 273	4 564	12 817	13 792	7 905	4 948	4 128	4 957	9 373	7 752	694	2 774	614	4 812	1 023	2 335	5 184	14 342	3 871
	Merluccius merluccius	14 113	26 249	32 611	58 166	44 788	28 299	13 713	15 239	16 827	15 768	9 289	8 126	11 972	3 889	26 721	4 022	25 052	13 108	31 705	2 820
	Trisopterus spp.	4 013	2 057	9 445	20 178	10 922	6 206	1 003	3 986	7 156	4 741	4 606	7 506	6 720	2 916	10 060	4 749	21 829	8 437	16 508	2 007
	Eledone spp.	10 566	3 968	41 450	56 005	30 137	22 619	1 586	5 079	21 171	8 700	13 736	20 852	32 266	8 233	20 380	1 914	25 586	13 672	39 307	1 114
	Citharus linguatula	6 465	7 574	13 532	17 555	12 406	6 554	4 546	5 135	4 796	8 377	10 138	9 116	13 446	7 292	2 962	5 612	14 543	6 871	18 797	781
	Ommastrephidae spp.	686	944	1 326	2 383	565	2 597	5 494	1 094	3 447	11 779	3 175	1 586	10 300	998	16 258	811	33 639	4 948	38 719	768
	Osteichthyes	9 293	14 062	22 761	27 896	13 730	19 245	10 907	8 858	8 677	11 714	11 550	9 082	14 592	7 255	10 126	6 178	4 258	0	0	0
OTB2	*Ommastrephidae* spp.	1 222	2 326	945	1 532	1 084	1 818	16 120	11 878	40 829	64 516	16 421	34 903	63 965	2 492	33 073	24 252	21 894	17 836	4 587	55 021
	Merluccius merluccius	26 669	41 352	36 530	36 727	45 785	27 368	84 356	75 343	83 605	111 573	59 704	55 711	68 729	14 865	44 330	46 555	46 484	32 964	7 542	54 678
	Squilla mantis	23 142	20 110	15 045	6 950	15 123	9 010	266	34 097	6 555	20 073	11 822	3 954	10 415	11 727	14 268	46 824	18 802	33 346	27 041	42 373
	Eledone spp.	43 278	28 462	28 294	29 199	46 985	24 489	7 896	47 926	104 472	106 115	82 153	82 278	90 546	16 028	41 941	51 381	8 230	48 109	25 080	40 572
	Trachurus spp.	7 289	4 295	10 461	70 601	81 414	31 919	1 886	54 569	15 287	20 379	14 146	12 376	25 974	8 279	11 521	20 558	12 510	13 279	10 856	29 858
	Trisopterus spp.	16 037	16 527	6 587	22 231	34 402	24 091	4 538	20 838	36 572	63 095	40 693	28 924	37 285	3 083	17 307	36 407	16 802	27 123	11 536	28 217
	Citharus linguatula	22 909	15 851	10 556	6 012	15 122	16 410	3 392	19 560	15 041	26 459	18 705	10 796	15 565	8 757	10 919	25 489	18 446	26 819	10 443	27 297
	Scomber scombrus	2 202	8 649	9 623	36 379	44 572	5 785	6 645	17 119	14 921	30 409	14 088	5 988	11 740	13 417	24 456	14 182	23 805	6 760	838	16 448
	Lophius spp.	5 419	7 958	2 648	13 450	23 398	5 490	7 357	20 395	42 553	46 379	30 294	36 600	40 741	3 003	18 967	38 270	19 038	29 133	6 171	11 370
	Osteichthyes	25 643	28 279	17 595	16 253	24 841	24 275	14 153	26 942	29 406	51 199	35 866	27 333	41 298	14 673	21 189	42 045	22	0	0	0
OTB4	*Merluccius merluccius*	47 156	81 284	74 342	63 454	72 162	27 082	114 157	79 635	18 560	789	50 190	68 731	7 004	65 835	14 975	1 998	2 022	1 162	572	1 057
	Mullus spp.	9 543	15 178	13 194	3 547	14 896	15 025	11 533	4 767	2 260	76	12 519	18 422	1 203	20 848	6 990	1 376	1 870	1 242	781	937
	Ommastrephidae spp.	4 802	6 280	6 627	4 787	2 295	2 934	22 669	21 560	1 887	138	24 363	26 151	1 356	18 539	16 702	403	3 612	185	832	697
	Lophius spp.	15 409	13 399	15 739	13 293	27 786	19 261	15 190	26 005	14 763	618	9 348	23 596	3 478	30 496	11 892	1 411	963	707	479	685
	Trachurus spp.	5 002	10 524	13 202	4 212	7 842	23 303	91 953	3 856	6 072	25	8 707	16 508	639	19 464	8 263	926	861	2 268	1 346	306
	Eledone spp.	39 458	29 537	53 892	38 083	44 219	21 628	41 209	52 306	32 084	172	63 626	112 074	18 944	77 582	27 885	464	469	312	114	135
	Scomber scombrus	28 913	60 360	36 412	28 077	85 682	34 246	74 643	8 514	885	330	49 085	42 863	214	22 637	1 702	107	277	13	138	44
	Engraulis encrasicolus	24 845	27 833	36 574	26 860	34 407	16 314	21 090	14 774	1 247	50	1 185	4 309	7	10 853	694	740	284	157	86	38
	Trisopterus spp.	18 887	16 429	18 095	17 127	33 489	18 145	23 384	15 019	10 077	52	14 792	26 165	8 876	28 173	12 951	270	217	16	25	18
	Osteichthyes	21 227	20 810	24 798	15 415	24 282	21 571	47 569	19 039	14 263	702	16 108	25 796	7 158	51 354	20 231	645	284	0	0	0

Table 40. Species composition and landings (in kg) by *métier* for L'Ampolla.

		South																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1A	*Squilla mantis*	2 374	7 502	7 038	5 743	4 795	4 896	2 516	7 204	4 183	5 341	3 074	4 850	3 213	2 453	3 374	4 989	6 894	4 355	4 284	5 858
	Mullus spp.	7 597	6 391	11 710	5 311	4 608	4 247	1 173	2 476	1 232	3 053	1 555	1 284	2 848	4 059	3 988	3 003	2 780	3 916	2 057	2 015
	Sepia officinalis	491	1 551	1 455	1 296	771	2 792	1 350	1 704	908	2 087	958	1 246	1 665	1 884	974	1 234	1 422	2 106	1 163	1 564
	Sparus aurata	2 905	3 145	4 069	2 456	2 497	3 454	820	1 131	768	1 589	1 062	3 750	2 242	2 332	1 231	871	1 672	1 755	971	911
	Octopus vulgaris	3 911	1 395	2 231	3 450	1 187	5 694	1 467	1 814	1 015	1 783	1 579	1 227	1 152	1 711	1 341	1 407	1 242	726	582	828
	Mugilidae spp.	5 607	1 679	3 461	1 821	588	457	37	385	294	240	125	300	248	1 425	278	380	135	609	262	525
	Trachurus spp.	481	526	1 582	1 209	1 187	3 556	399	1 550	64	586	279	231	722	1 578	547	701	696	801	564	517
	Conger conger	598	3 018	1 874	2 370	2 116	1 979	531	1 919	1 509	1 973	827	803	576	592	832	757	750	812	537	322
	Dicentrarchus labrax	1 408	3 763	3 580	1 941	956	1 043	946	1 703	1 014	1 146	679	740	602	524	457	492	211	278	416	307
	Osteichthyes	377	846	2 519	2 166	1 430	2 206	798	2 764	830	1 033	715	1 287	490	785	540	707	0	0	0	0
OTB1B	*Mullus* spp.	4 045	2 272	1 215	529	364	1 251	560	413	197	754	376	467	751	1 561	2 179	2 083	580	1 005	2 612	3 251
	Merluccius merluccius	720	3 286	5 068	1 041	860	1 455	1 903	3 276	253	1 460	1 243	663	585	558	881	578	125	693	1 528	1 854
	Squilla mantis	5 951	5 262	8 201	3 384	3 128	6 747	5 411	3 845	1 122	2 040	2 425	2 088	2 897	2 566	1 900	1 685	1 143	4 078	5 000	1 528
	Eledone spp.	64	319	4 899	59	387	449	861	3 410	43	4 253	3 438	3 210	2 097	1 485	1 523	788	408	337	2 640	677
	Citharus linguatula	803	1 091	3 863	401	603	732	1 250	2 631	25	1 182	1 441	1 092	844	970	500	669	522	881	1 450	629
	Trisopterus spp.	48	445	2 480	790	650	745	425	1 581	37	1 971	2 326	868	780	708	815	886	357	540	853	568
	Octopus vulgaris	2 074	530	690	582	841	1 508	1 422	454	177	693	390	629	393	702	586	540	296	788	467	346
	Conger conger	2 278	1 834	2 306	1 144	849	1 846	1 288	762	61	770	457	437	694	640	457	520	205	206	487	240
	Dicentrarchus labrax	662	1 076	2 028	1 415	1 532	2 268	1 585	222	508	502	301	236	453	332	243	59	77	389	197	2
	Osteichthyes	2 440	2 076	3 804	1 168	1 056	1 854	2 782	3 785	285	2 182	2 863	1 552	892	843	847	1 599	107	0	0	0
OTB2A	*Merluccius merluccius*	2 485	8 423	4 420	4 257	3 028	4 844	7 960	5 185	2 274	2 622	2 644	2 018	2 458	1 137	1 778	2 170	2 372	895	372	4 617
	Ommastrephidae spp.	230	606	236	108	59	301	1 124	424	515	1 924	932	710	3 051	1 139	2 647	1 257	2 451	397	270	3 037
	Squilla mantis	4 697	5 163	1 764	3 164	1 858	1 492	1 966	1 808	2 398	527	854	516	933	421	961	2 252	1 933	2 558	964	1 489
	Liocarcinus depurator	1 664	5 540	4 687	1 929	2 351	3 717	2 225	545	509	588	380	327	152	37	582	577	826	846	115	1 260
	Citharus linguatula	3 416	3 778	2 529	1 618	1 836	4 964	1 909	1 426	1 358	529	724	363	644	571	583	818	702	1 261	325	1 163
	Mullus spp.	1 156	1 423	1 150	1 891	2 241	2 466	2 866	2 036	1 862	1 808	1 596	2 109	3 258	513	704	860	833	1 197	352	1 025
	Eledone spp.	5 157	5 103	4 936	3 554	2 722	5 407	1 778	3 879	3 935	2 225	4 455	4 604	4 628	2 263	2 610	3 033	1 764	1 711	1 258	979
	Trisopterus spp.	2 283	3 116	491	2 814	578	2 834	1 848	1 162	1 106	1 462	1 209	1 122	1 033	1 532	1 482	2 382	1 735	539	560	969
	Trachurus spp.	108	459	1 105	1 075	922	5 867	1 176	2 270	629	381	607	590	1 428	1 564	949	1 052	1 524	544	1 076	410
	Osteichthyes	4 025	4 563	3 985	2 411	1 473	6 540	3 321	3 113	2 149	1 412	1 821	1 391	1 625	2 069	2 127	2 410	339	0	0	0
OTB2B	*Ommastrephidae* spp.	203	539	968	1 162	497	164	7 221	3 308	3 264	5 021	3 336	5 069	5 638	1 368	3 328	1 421	3 038	2 084	3 683	1 843
	Eledone spp.	6 308	1 588	8 735	15 307	15 284	3 316	2 523	7 856	16 050	7 540	16 200	15 071	7 318	8 000	4 126	1 010	510	3 787	2 179	1 629
	Merluccius merluccius	5 412	5 282	5 619	12 337	11 828	2 687	9 472	8 291	6 408	6 628	8 132	6 299	5 132	6 837	6 157	2 404	8 749	4 929	3 196	1 019
	Trisopterus spp.	1 379	507	1 516	4 439	8 262	3 937	1 578	1 853	4 247	5 151	4 698	3 710	3 743	2 182	2 295	1 076	1 680	1 996	1 385	726
	Lophius spp.	801	314	1 567	5 116	7 541	1 361	1 479	4 866	8 623	6 099	5 642	7 020	5 847	3 755	3 604	2 108	4 121	3 416	2 470	643
	Citharus linguatula	4 946	1 068	2 480	7 302	6 989	2 784	7 690	4 690	4 504	2 674	2 925	2 077	1 860	1 817	902	642	1 931	1 381	998	531
	Liocarcinus depurator	4 966	0	2 629	8 443	6 882	2 071	5 703	2 388	1 620	1 979	2 937	890	474	999	2 667	1 289	3 755	1 532	495	198
	Cepola macrophthalma	2 740	1 527	3 199	4 379	6 442	1 939	2 441	1 041	1 149	1 439	1 171	1 058	799	695	258	94	174	101	335	126
	Scomber scombrus	1 144	1 685	2 116	4 090	6 215	334	2 187	2 176	1 167	2 491	4 711	3 932	976	4 216	1 357	1 307	3 045	1 244	987	79
	Osteichthyes	6 400	1 733	3 437	7 305	7 722	2 940	10 500	5 442	7 849	6 904	7 103	6 483	5 358	6 150	3 217	2 242	0	0	0	0

Table 41. Species composition and landings (in kg) by *métier* for La Ràpita.

		South																			
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1A	*Squilla mantis*	31 635	32 342	21 448	28 813	9 535	31 738	33 956	1 976	2 144	10 619	13 461	12 736	17 229	5 244	3 453	1 893	11 020	11 382	5 690	10 393
	Mullus spp.	15 688	8 919	9 132	13 038	11 523	5 983	8 691	1 613	3 882	4 481	9 408	5 224	6 078	3 947	2 089	7 806	6 937	8 957	4 166	8 353
	Sepia officinalis	3 111	2 745	2 052	3 410	1 934	5 312	5 924	404	496	2 158	3 131	2 495	2 904	2 124	2 271	609	2 214	4 498	1 825	4 202
	Penaeus kerathurus	3 236	2 911	3 544	2 537	1 993	5 344	4 010	105	149	897	2 219	1 676	2 249	867	1 034	305	1 954	2 767	783	2 413
	Sparus aurata	3 590	2 409	852	1 731	4 231	10 071	4 929	7 179	2 998	2 915	3 073	1 552	1 954	1 079	1 217	547	2 564	1 907	1 762	1 906
	Trachurus spp.	1 631	1 329	1 248	1 199	183	2 309	2 545	1 047	1 412	970	2 304	1 729	1 630	1 003	120	1 326	3 095	2 668	1 964	1 841
	Mugilidae spp.	2 853	1 150	3 806	1 430	860	1 791	1 810	1 080	650	333	982	690	1 198	1 289	211	1 007	1 184	767	1 307	1 577
	Conger conger	5 635	7 030	3 635	7 776	1 425	6 299	4 038	210	173	2 247	2 430	2 134	6 380	1 258	875	244	1 866	1 296	721	915
	DIVERSOS CEFALÒPODS	10 443	5 620	5 724	17 190	2 785	14 107	52	0	0	0	0	0	0	0	0	0	0	0	0	0
	Osteichthyes	4 538	4 243	6 650	4 845	1 637	4 359	6 577	2 594	2 352	3 112	5 291	6 962	6 963	3 612	1 502	323	1 985	0	0	0
OTB1B	*Squilla mantis*	5 063	24	16 497	5 876	24 882	14 308	19 141	44 006	28 250	19 884	20 615	20 177	10 659	26 978	24 657	16 925	9 104	13 895	16 081	10 347
	Citharus linguatula	583	0	675	51	1 065	243	1 299	1 140	1 881	3 140	3 680	4 676	2 553	5 974	4 251	3 152	1 599	4 044	3 412	1 935
	Octopus vulgaris	0	0	0	0	0	0	3	7 448	2 137	2 213	1 791	1 807	543	2 608	6 757	1 802	1 785	1 472	1 068	1 010
	Mullus spp.	161	11	1 203	762	6 510	1 308	170	8 093	1 430	2 820	1 374	2 374	386	4 295	9 377	6 176	1 843	2 822	3 795	902
	Merluccius merluccius	968	0	1 190	407	1 943	938	1 122	3 411	2 101	2 607	1 576	3 416	1 315	1 305	1 701	1 061	665	1 353	1 029	860
	Conger conger	999	0	3 433	808	4 529	2 595	2 738	8 303	4 114	3 579	3 364	3 993	1 740	5 719	4 365	3 462	2 202	2 010	1 431	612
	Penaeus kerathurus	272	52	775	296	2 248	1 751	1 135	3 480	1 982	630	959	899	316	1 413	2 041	2 535	1 554	1 334	1 056	463
	Bolinus brandaris	1 438	9	1 379	1 389	2 977	1 668	2 758	6 650	4 264	1 046	906	900	636	1 447	2 398	1 249	537	857	757	189
	Trachurus spp.	272	12	244	220	693	928	904	2 846	254	1 857	457	1 733	95	1 909	4 954	2 563	1 039	1 601	2 019	90
	Osteichthyes	1 557	6	2 281	4 234	4 373	2 803	2 480	7 328	4 128	5 325	4 347	14 224	7 425	11 168	12 919	5 251	13	0	0	0
OTB2A	*Squilla mantis*	10 879	15 153	1 318	9 909	9 912	11 573	6 049	16 601	16 237	10 090	5 841	0	2 173	2 832	8 128	8 332	14 349	9 444	8 218	6 488
	Citharus linguatula	4 087	1 215	29	1 850	1 729	4 392	4 048	7 320	5 096	4 059	3 529	0	617	1 500	2 958	2 176	4 551	3 677	3 303	3 253
	Merluccius merluccius	2 886	2 471	79	1 364	2 007	3 137	1 717	5 167	3 289	3 901	1 898	0	767	648	2 358	1 044	2 139	2 555	1 006	1 100
	Liocarcinus depurator	0	0	0	0	0	0	0	3 352	2 044	1 877	2 395	0	184	205	2 789	645	2 106	3 121	1 112	688
	Bolinus brandaris	1 768	2 214	330	444	1 154	1 320	753	1 617	1 778	898	472	0	450	268	706	602	991	690	348	646
	Lophius spp.	458	60	8	554	226	688	500	1 132	1 678	2 377	2 055	0	160	943	2 528	355	2 083	1 162	820	489
	Octopus vulgaris	0	0	0	0	0	0	0	2 669	4 680	8 637	3 945	0	1 363	128	539	1 310	653	978	244	455
	Conger conger	1 821	2 604	4	1 500	1 691	2 142	834	1 837	1 657	1 278	550	0	491	486	877	1 750	1 506	853	699	227
	Trisopterus spp.	1 094	430	4	1 318	1 432	3 493	670	1 967	1 706	3 190	2 030	0	194	813	1 768	2 032	2 674	1 881	1 756	0
	Osteichthyes	4 128	5 869	1 923	2 347	3 081	5 295	3 918	8 463	4 476	5 660	4 997	0	2 204	5 382	10 948	5 214	6 127	0	0	0
OTB2B	*Ommastrephidae* spp.	221	8	0	0	0	0	2 906	3 004	2 614	5 186	1 591	4 929	3 017	774	2 540	762	3 303	652	1 091	5 231
	Citharus linguatula	3 556	5 491	6 474	5 063	5 287	4 083	2 558	4 379	5 016	2 480	2 598	5 143	5 212	3 137	1 068	3 364	3 020	2 694	4 359	4 129
	Pagellus erythrinus	330	297	399	332	721	1 097	3 420	2 361	2 209	4 096	1 751	2 168	3 946	2 010	1 930	2 217	2 626	2 788	2 171	3 662
	Squilla mantis	731	7 292	11 000	3 352	4 465	1 983	2 815	3 622	2 438	861	736	5 692	7 150	1 336	475	5 056	3 711	3 651	5 507	3 408
	Trachurus spp.	1 336	722	375	137	1 100	4 356	7 527	2 651	2 813	4 376	2 010	2 699	3 700	1 061	1 115	1 747	1 783	1 998	3 995	1 717
	Merluccius merluccius	3 759	5 103	5 309	3 652	5 006	4 101	3 507	12 677	4 930	4 040	4 184	5 775	4 394	2 836	986	3 164	3 235	1 624	2 361	1 336
	Liocarcinus depurator	0	0	0	0	0	0	1 074	4 466	3 019	2 545	2 977	4 044	3 245	852	1 623	4 208	4 118	3 451	2 003	1 227
	Lophius spp.	826	830	1 979	3 517	3 335	1 180	161	2 441	4 278	2 348	2 121	5 826	4 565	2 048	1 056	3 494	1 857	1 184	1 292	596
	Osteichthyes	4 473	7 401	7 166	5 856	7 793	7 638	10 849	11 735	8 664	7 652	6 612	18 412	13 077	10 145	4 049	7 922	5 481	0	0	0
	Brachyura	2 686	12 338	12 059	7 185	7 197	5 451	373	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 42. Species composition and landings (in kg) by *métier* for Les Cases d'Alcanar.

										South													
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OTB1A	*Squilla mantis*	31 635	32 342	21 448	28 813	9 535	31 738	33 956	1 976	2 144	10 619	13 461	12 736	17 229	5 244	3 453	1 893	11 020	11 382	5 690	10 393
	Mullus spp.	15 688	8 919	9 132	13 038	11 523	5 983	8 691	1 613	3 882	4 481	9 408	5 224	6 078	3 947	2 089	7 806	6 937	8 957	4 166	8 353
	Sepia officinalis	3 111	2 745	2 052	3 410	1 934	5 312	5 924	404	496	2 158	3 131	2 495	2 904	2 124	2 271	609	2 214	4 498	1 825	4 202
	Penaeus kerathurus	3 236	2 911	3 544	2 537	1 993	5 344	4 010	105	149	897	2 219	1 676	2 249	867	1 034	305	1 954	2 767	783	2 413
	Sparus aurata	3 590	2 409	852	1 731	4 231	10 071	4 929	7 179	2 998	2 915	3 073	1 552	1 954	1 079	1 217	547	2 564	1 907	1 762	1 906
	Trachurus spp.	1 631	1 329	1 248	1 199	183	2 309	2 545	1 047	1 412	970	2 304	1 729	1 630	1 003	120	1 326	3 095	2 668	1 964	1 841
	Mugilidae spp.	2 853	1 150	3 806	1 430	860	1 791	1 810	1 080	650	333	982	690	1 198	1 289	211	1 007	1 184	767	1 307	1 577
	Conger conger	5 635	7 030	3 635	7 776	1 425	6 299	4 038	210	173	2 247	2 430	2 134	6 380	1 258	875	244	1 866	1 296	721	915
	DIVERSOS CEFALÒPODS	10 443	5 620	5 724	17 190	2 785	14 107	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Osteichthyes	4 538	4 243	6 650	4 845	1 637	4 359	6 577	2 594	2 352	3 112	5 291	6 962	6 963	3 612	1 502	323	1 985	0	0	0
OTB1B	*Squilla mantis*	5 063	24	16 497	5 876	24 882	14 308	19 141	44 006	28 250	19 884	20 615	20 177	10 659	26 978	24 657	16 925	9 104	13 895	16 081	10 347
	Citharus linguatula	583	0	675	51	1 065	243	1 299	1 140	1 881	3 140	3 680	4 676	2 553	5 974	4 251	3 152	1 599	4 044	3 412	1 935
	Octopus vulgaris	0	0	0	0	0	0	3	7 448	2 137	2 213	1 791	1 807	543	2 608	6 757	1 802	1 785	1 472	1 068	1 010
	Mullus spp.	161	11	1 203	762	6 510	1 308	170	8 093	1 430	2 820	1 374	2 374	386	4 295	9 377	6 176	1 843	2 822	3 795	902
	Merluccius merluccius	968	0	1 190	407	1 943	938	1 122	3 411	2 101	2 607	1 576	3 416	1 315	1 305	1 701	1 061	665	1 353	1 029	860
	Conger conger	999	0	3 433	808	4 529	2 595	2 738	8 303	4 114	3 579	3 364	3 993	1 740	5 719	4 365	3 462	2 202	2 010	1 431	612
	Penaeus kerathurus	272	52	775	296	2 248	1 751	1 135	3 480	1 982	630	959	899	316	1 413	2 041	2 535	1 554	1 334	1 056	463
	Bolinus brandaris	1 438	9	1 379	1 389	2 977	1 668	2 758	6 650	4 264	1 046	906	900	636	1 447	2 398	1 249	537	857	757	189
	Trachurus spp.	272	12	244	220	693	928	904	2 846	254	1 857	457	1 733	95	1 909	4 954	2 563	1 039	1 601	2 019	90
	Osteichthyes	1 557	6	2 281	4 234	4 373	2 803	2 480	7 328	4 128	5 325	4 347	14 224	7 425	11 168	12 919	5 251	13	0	0	0
OTB2A	*Squilla mantis*	10 879	15 153	1 318	9 909	9 912	11 573	6 049	16 601	16 237	10 090	5 841	0	2 173	2 832	8 128	8 332	14 349	9 444	8 218	6 488
	Citharus linguatula	4 087	1 215	29	1 850	1 729	4 392	4 048	7 320	5 096	4 059	3 529	0	617	1 500	2 958	2 176	4 551	3 677	3 303	3 253
	Merluccius merluccius	2 886	2 471	79	1 364	2 007	3 137	1 717	5 167	3 289	3 901	1 898	0	767	648	2 358	1 044	2 139	2 555	1 006	1 100
	Liocarcinus depurator	0	0	0	0	0	0	0	3 352	2 044	1 877	2 395	0	184	205	2 789	645	2 106	3 121	1 112	688
	Bolinus brandaris	1 768	2 214	330	444	1 154	1 320	753	1 617	1 778	898	472	0	450	268	706	602	991	690	348	646
	Lophius spp.	458	60	8	554	226	688	500	1 132	1 678	2 377	2 055	0	160	943	2 528	355	2 083	1 162	820	489
	Octopus vulgaris	0	0	0	0	0	0	0	2 669	4 680	8 637	3 945	0	1 363	128	539	1 310	653	978	244	455
	Conger conger	1 821	2 604	4	1 500	1 691	2 142	834	1 837	1 657	1 278	550	0	491	486	877	1 750	1 506	853	699	227
	Trisopterus spp.	1 094	430	4	1 318	1 432	3 493	670	1 967	1 706	3 190	2 030	0	194	813	1 768	2 032	2 674	1 881	1 756	0
	Osteichthyes	4 128	5 869	1 923	2 347	3 081	5 295	3 918	8 463	4 476	5 660	4 997	0	2 204	5 382	10 948	5 214	6 127	0	0	0
OTB2B	*Ommastrephidae* spp.	221	8	0	0	0	0	2 906	3 004	2 614	5 186	1 591	4 929	3 017	774	2 540	762	3 303	652	1 091	5 231
	Citharus linguatula	3 556	5 491	6 474	5 063	5 287	4 083	2 558	4 379	5 016	2 480	2 598	5 143	5 212	3 137	1 068	3 364	3 020	2 694	4 359	4 129
	Pagellus erythrinus	330	297	399	332	721	1 097	3 420	2 361	2 209	4 096	1 751	2 168	3 946	2 010	1 930	2 217	2 626	2 788	2 171	3 662
	Squilla mantis	731	7 292	11 000	3 352	4 465	1 983	2 815	3 622	2 438	861	736	5 692	7 150	1 336	475	5 056	3 711	3 651	5 507	3 408
	Trachurus spp.	1 336	722	375	137	1 100	4 356	7 527	2 651	2 813	4 376	2 010	2 699	3 700	1 061	1 115	1 747	1 783	1 998	3 995	1 717
	Merluccius merluccius	3 759	5 103	5 309	3 652	5 006	4 101	3 507	12 677	4 930	4 040	4 184	5 775	4 394	2 836	986	3 164	3 235	1 624	2 361	1 336
	Liocarcinus depurator	0	0	0	0	0	0	1 074	4 466	3 019	2 545	2 977	4 044	3 245	852	1 623	4 208	4 118	3 451	2 003	1 227
	Lophius spp.	826	830	1 979	3 517	3 335	1 180	161	2 441	4 278	2 348	2 121	5 826	4 565	2 048	1 056	3 494	1 857	1 184	1 292	596
	Osteichthyes	4 473	7 401	7 166	5 856	7 793	7 638	10 849	11 735	8 664	7 652	6 612	18 412	13 077	10 145	4 049	7 922	5 481	0	0	0
	Brachyura	2 686	12 338	12 059	7 185	7 197	5 451	373	0	0	0	0	0	0	0	0	0	0	0	0	0

Annex 4

Monthly size-frequency distribution for 2021

Hake (*Merluccius merluccius*)

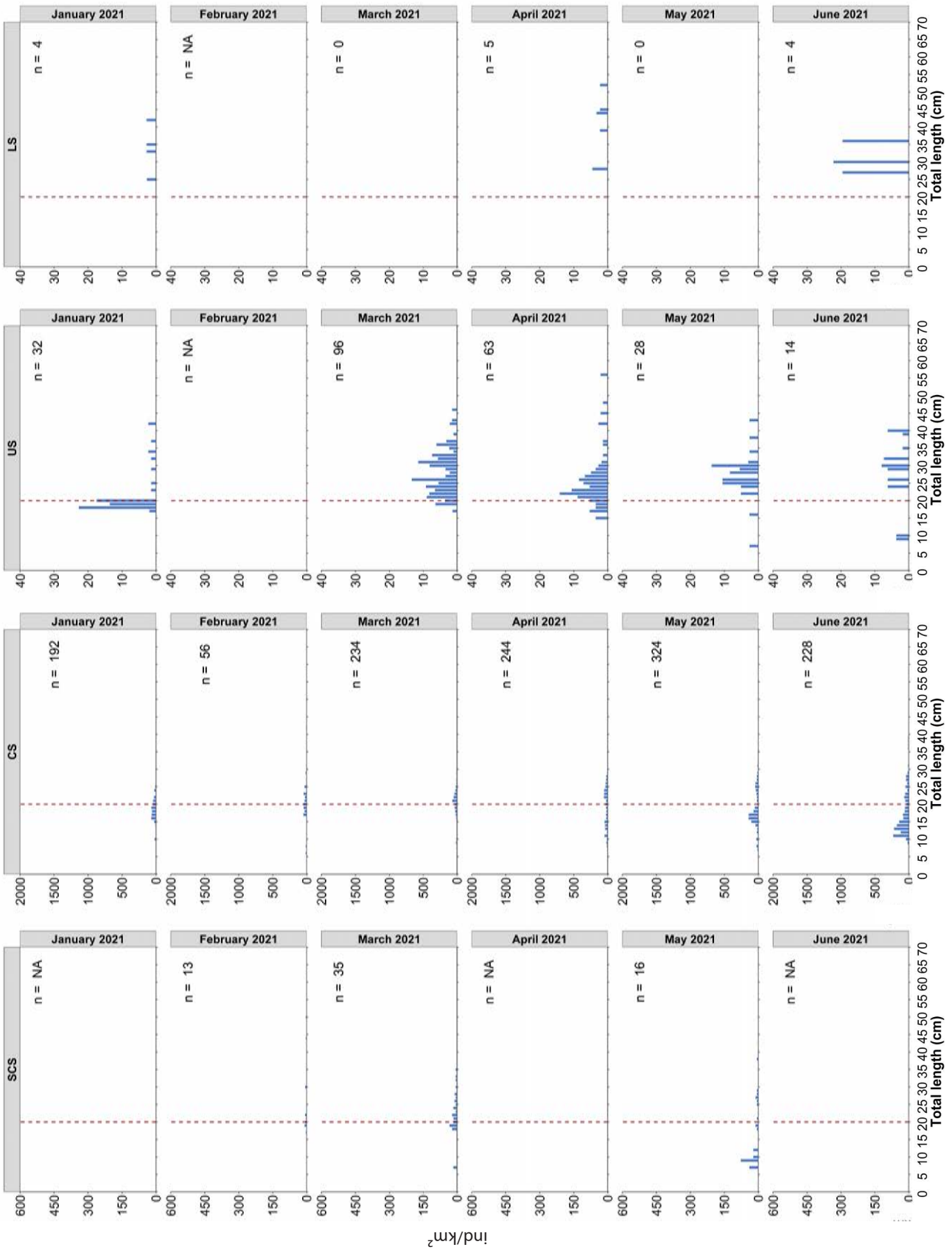

Figure 135. Monthly length-frequency distribution of Hake at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from January to June 2021. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) total number of measured individuals.

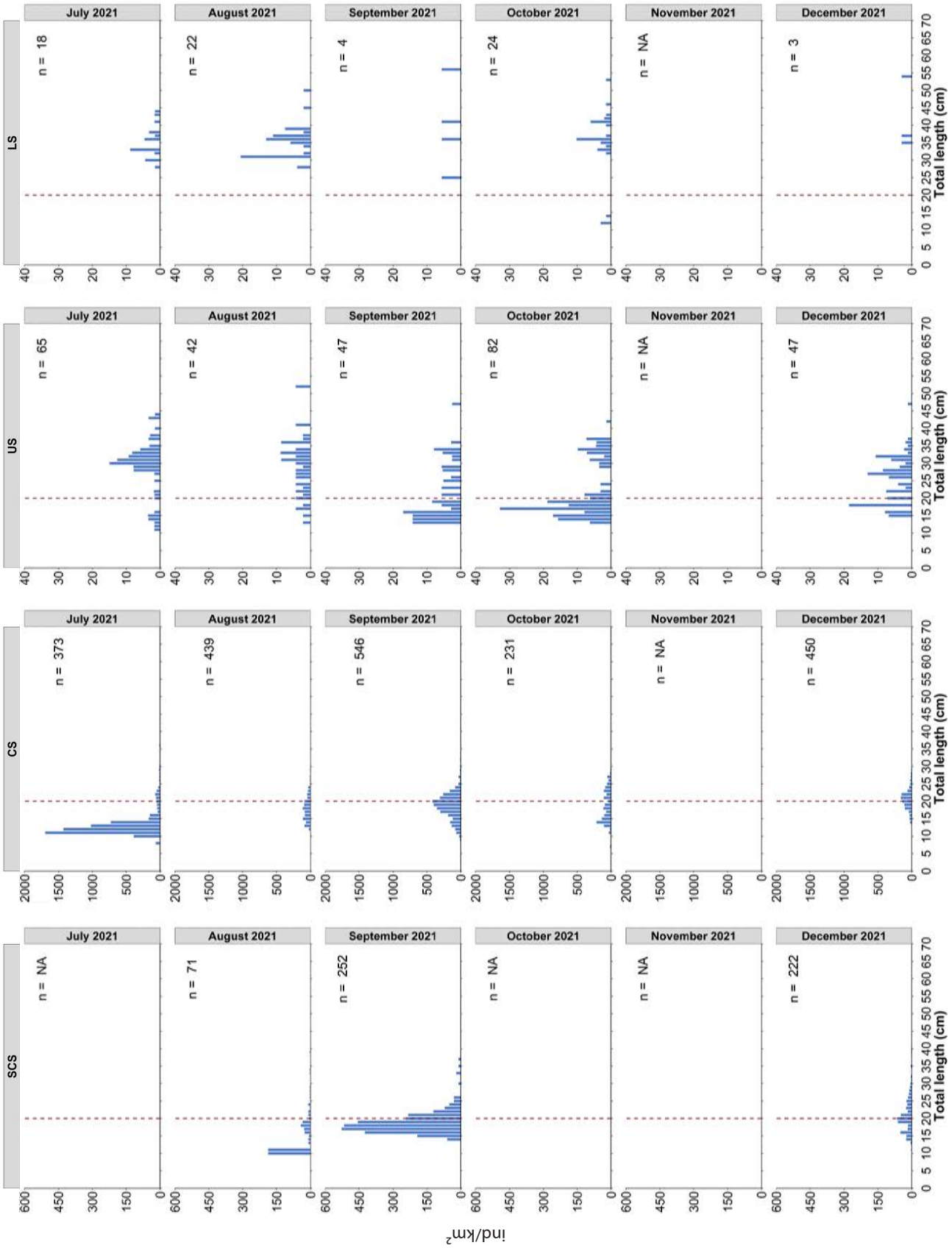

Figure 136. Monthly length-frequency distribution of Hake atdifferent depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from July to December 2021. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) total number of measured individuals.

Norway lobster (*Nephrops norvegicus*)

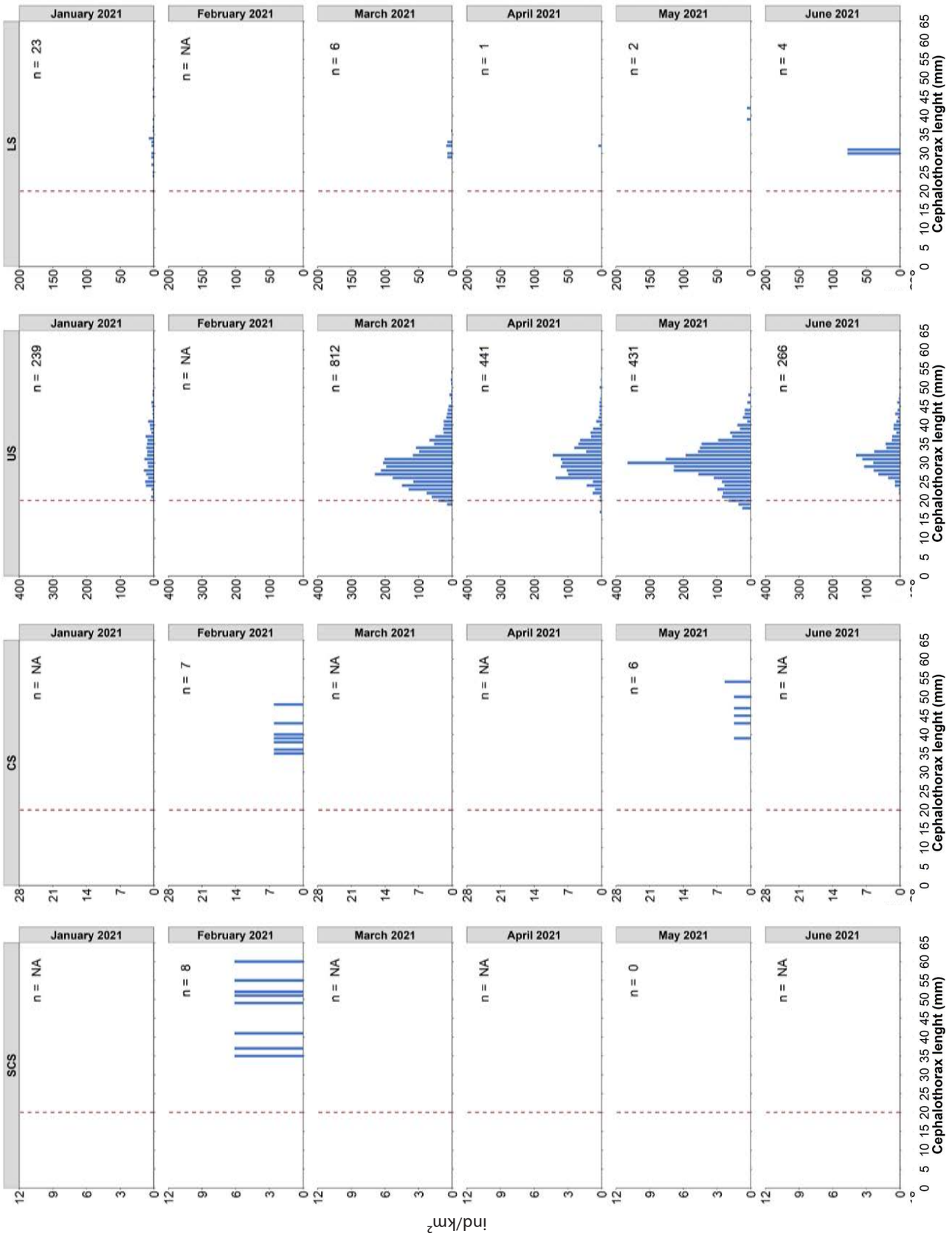

Figure 137. Monthly length-frequency distribution of Norway lobster at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from January to June 2021. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) total number of measured individuals.

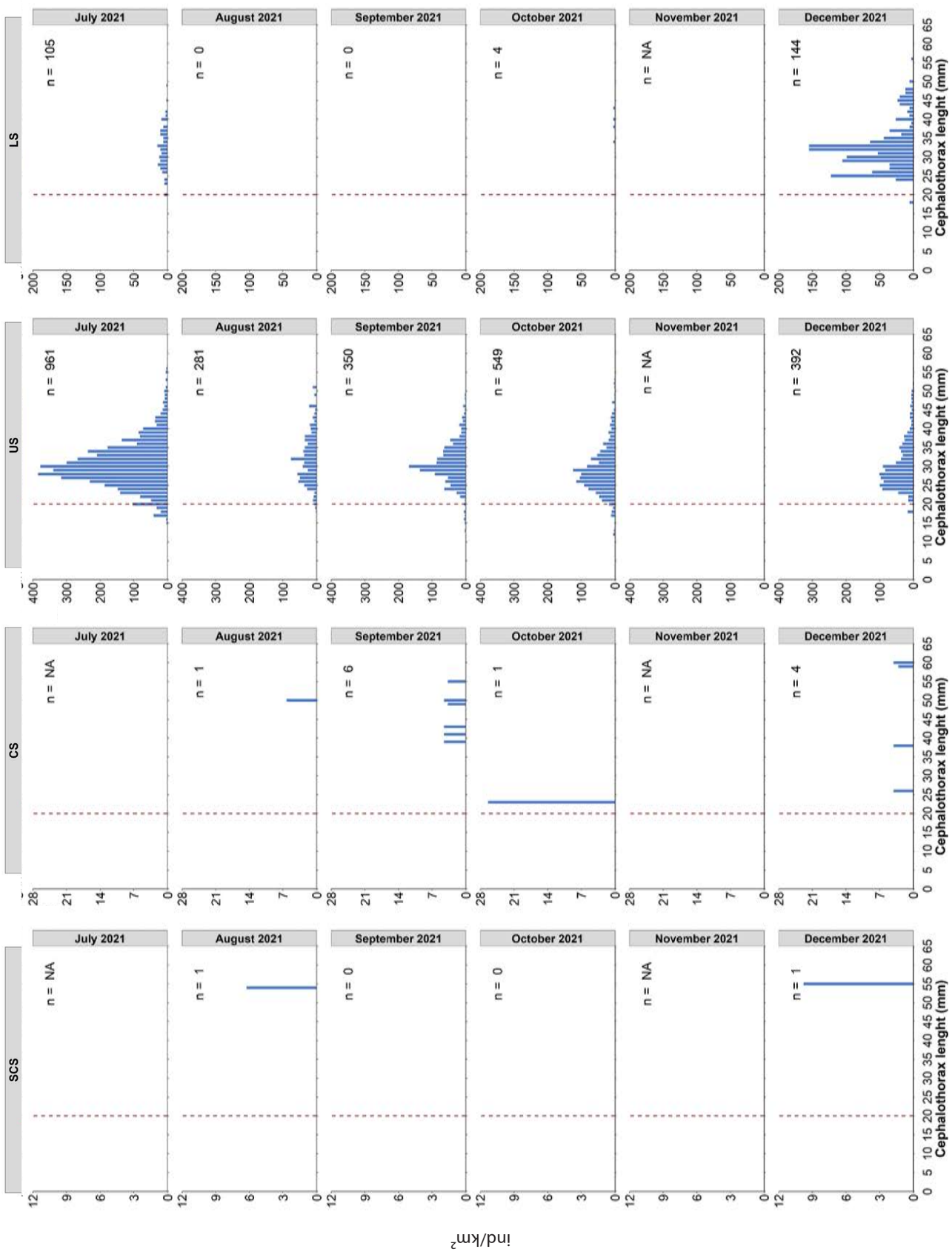

Figure 138. Monthly length-frequency distribution of Norway lobster at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from July to December 2021. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) total number of measured individuals.

Blue and red shrimp (*Aristeus antennatus*)

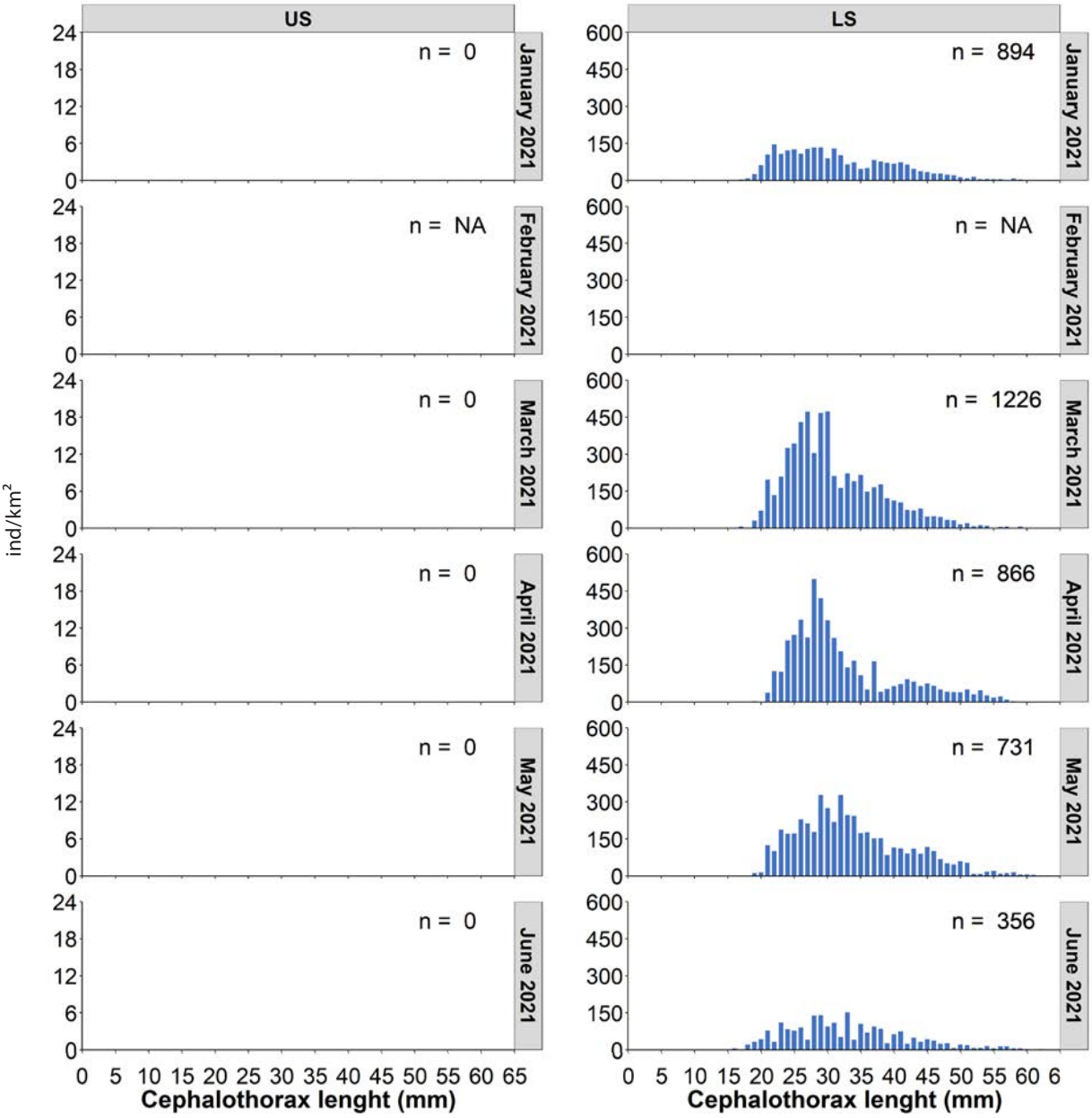

Figure 139. Monthly length-frequency distribution of Blue and red shrimp at different depth strata (US; Upper Slope and LS; Lower Slope) from January to June 2021. (n) total number of measured individuals.

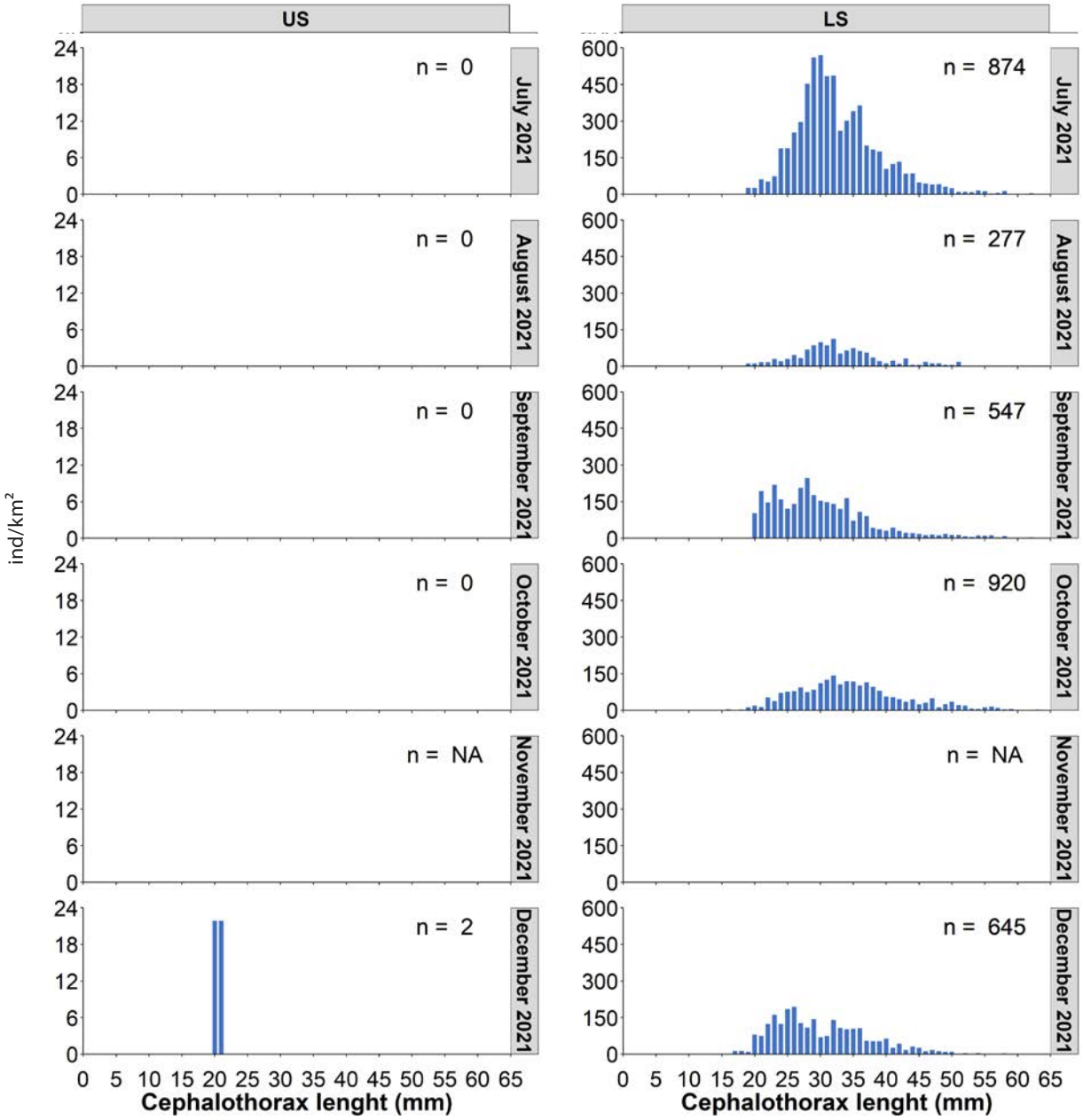

Figure 140. Monthly length-frequency distribution of Blue and red shrimp at different depth strata (US; Upper Slope and LS; Lower Slope) from July to December 2021. (n) total number of measured individuals.

Horned octopus (*Eledone cirrhosa*)

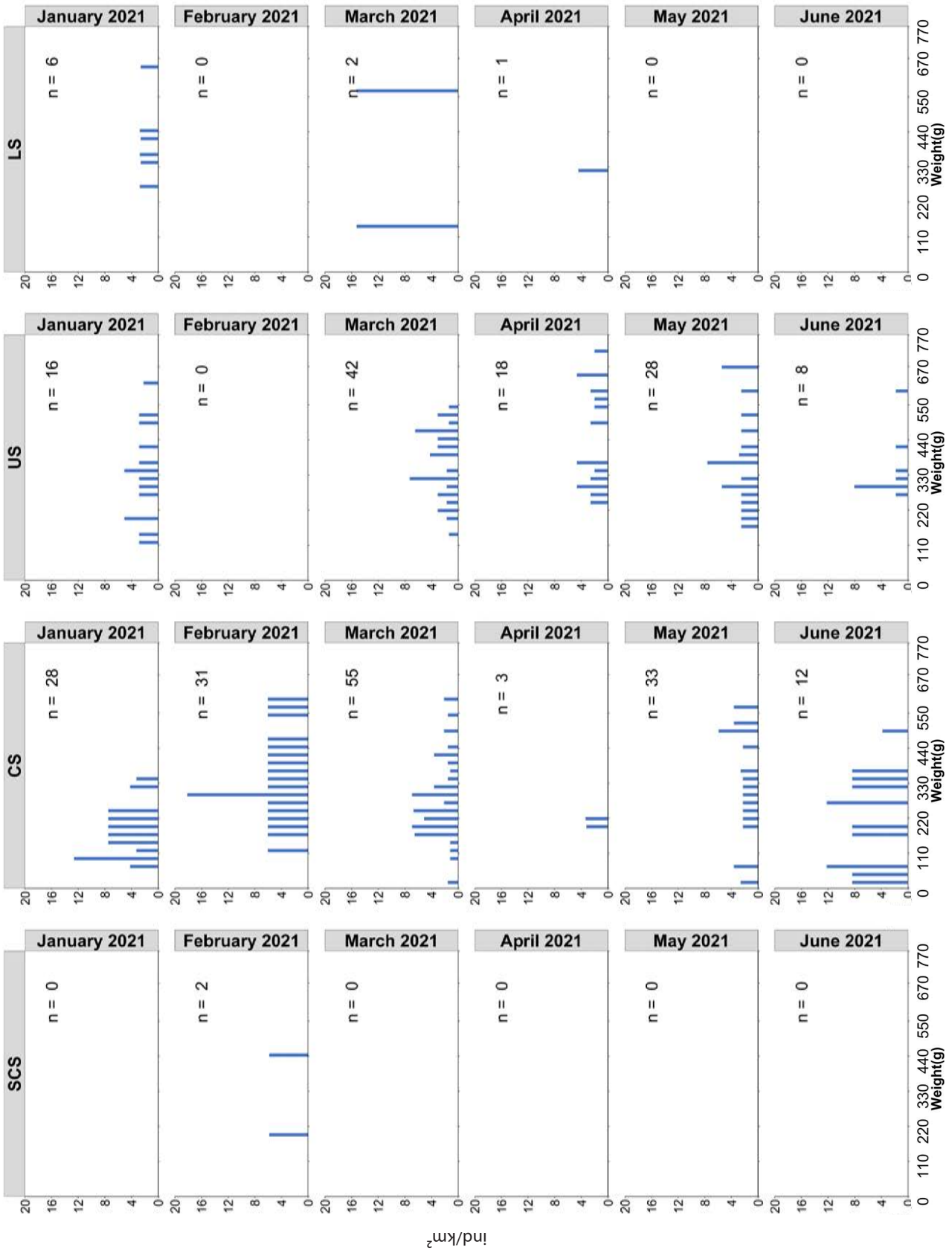

Figure 141. Monthly weight-frequency distribution of Horned octopus at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from January to June 2021. (n) total number of measured individuals.

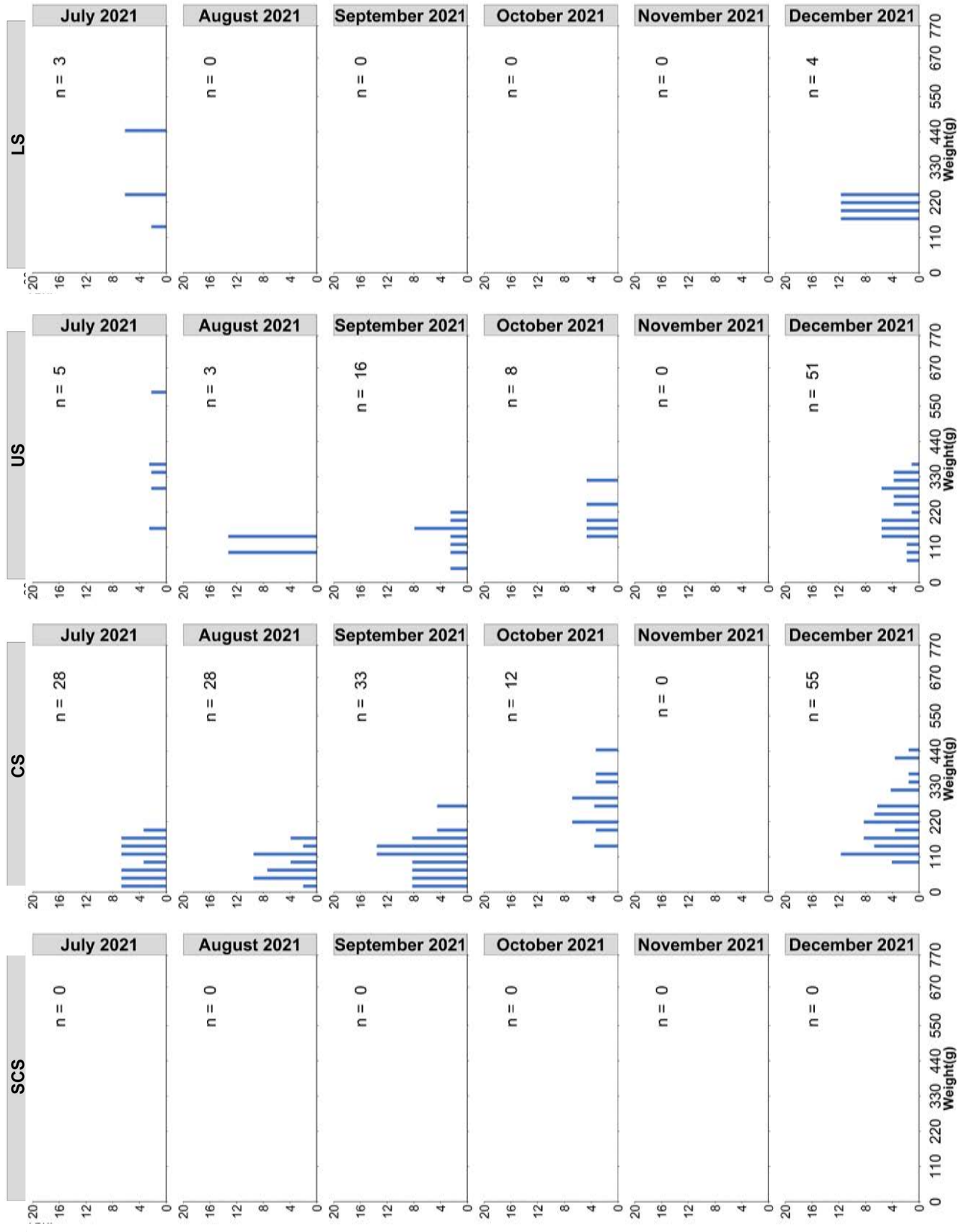

Figure 142. Monthly weight-frequency distribution of Horned octopus at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf, US; Upper Slope and LS; Lower Slope) from July to December 2021. (n) total number of measured individuals.

Spottail mantis shrimp (*Squilla mantis*)

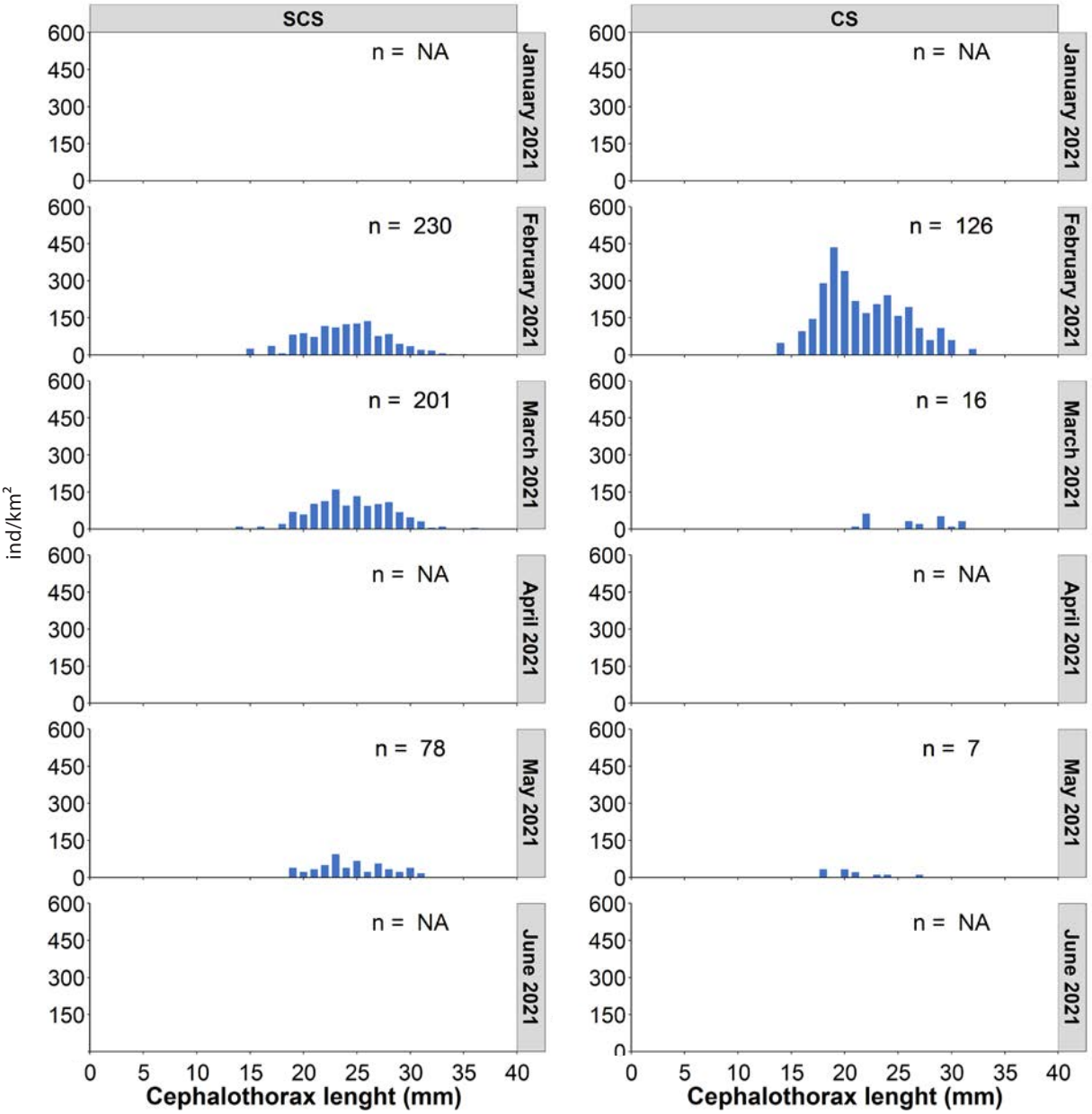

Figure 143. Monthly length-frequency distribution of Spottail mantis shrimp at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf) from January to June 2021. (n) total number of measured individuals.

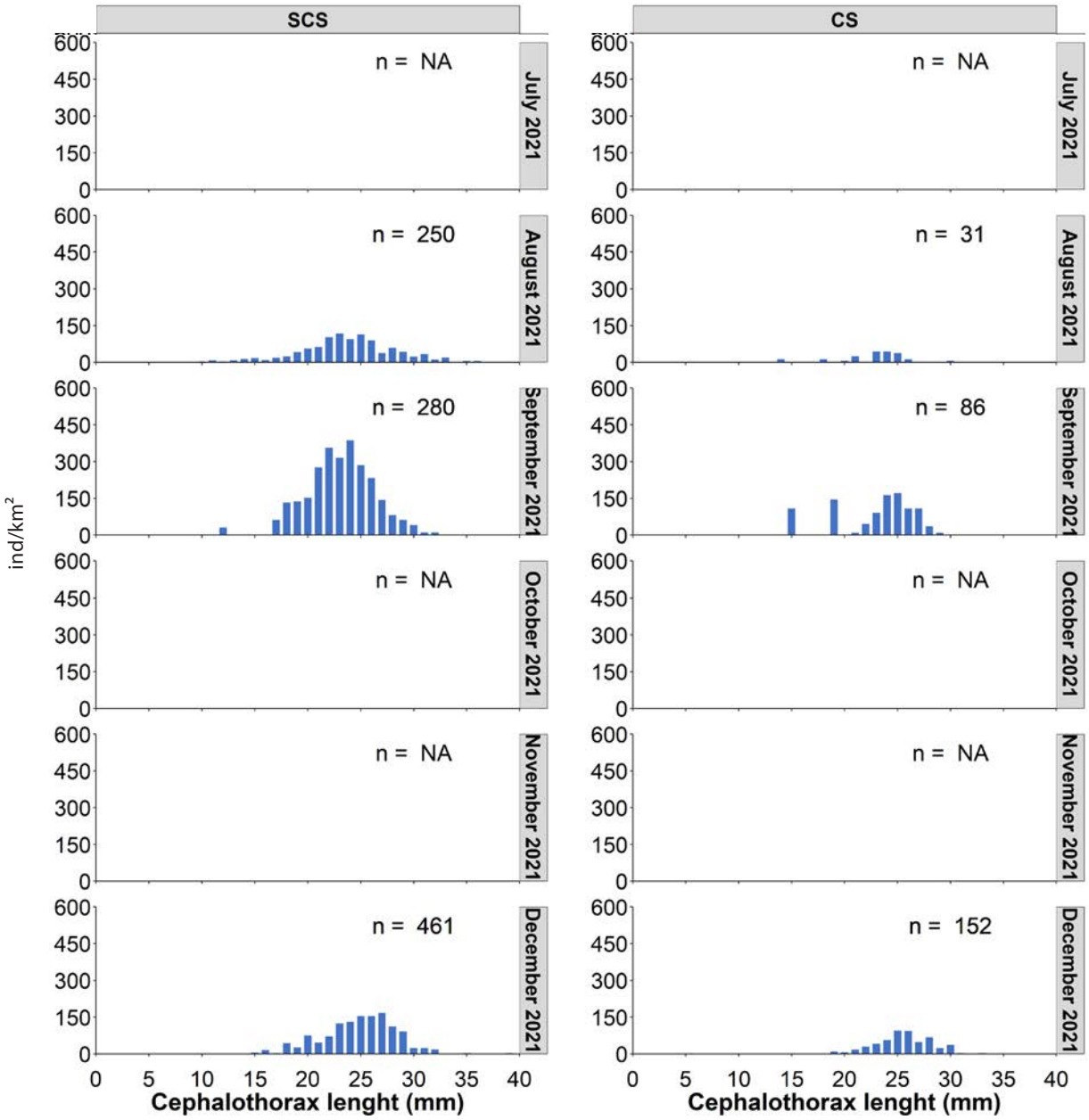

Figure 144. Monthly length-frequency distribution of Spottail mantis shrimp at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf) from July to December 2021. (n) total number of measured individuals.

Caramote prawn (*Penaeus kerathurus*)

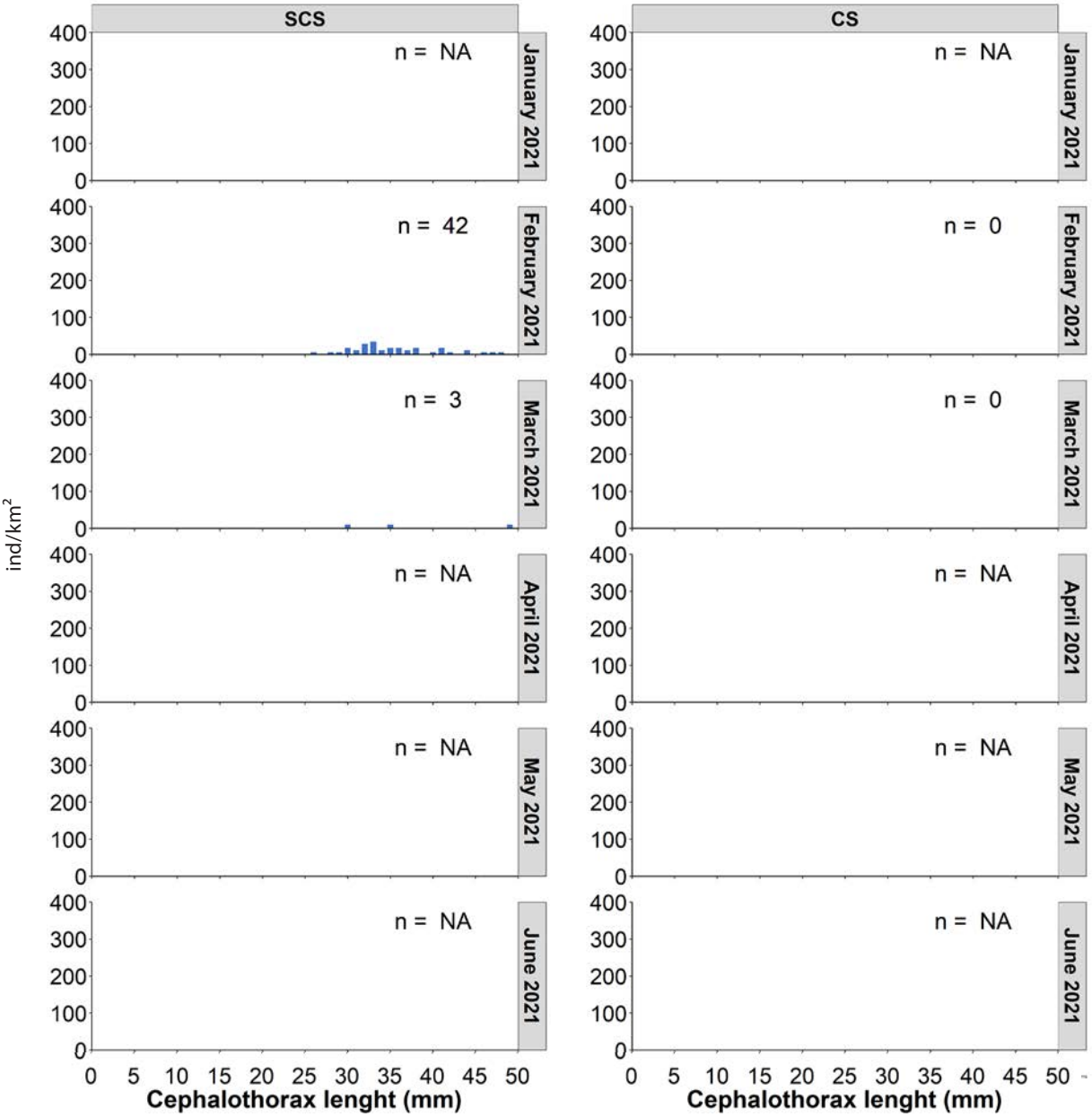

Figure 145. Monthly length-frequency distribution of Caramote prawn at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf) from January to June 2021. (n) total number of measured individuals.

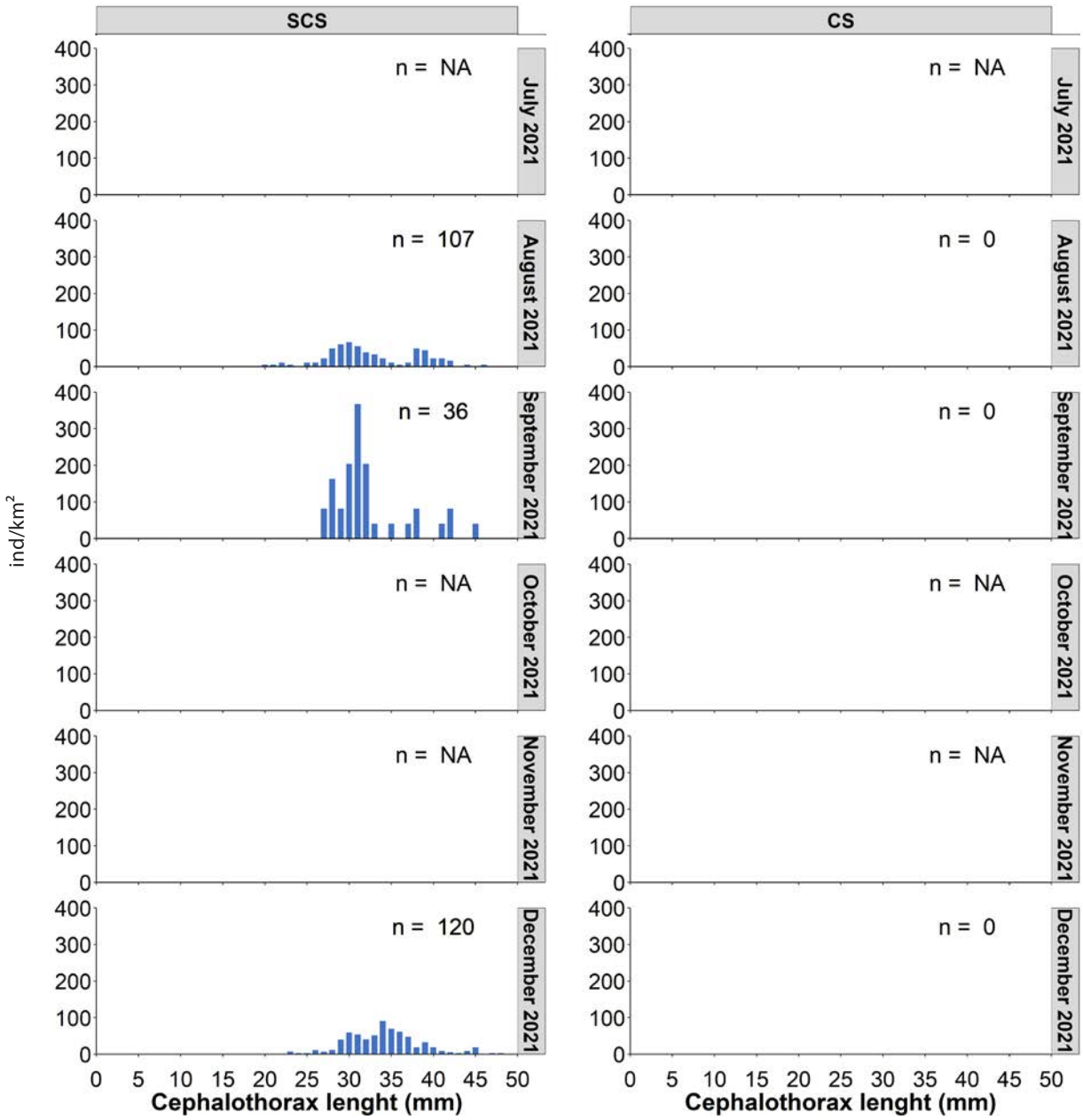

Figure 146. Monthly length-frequency distribution of Caramote prawn at different depth strata (SCS; Shallow Continental Shelf, CS; Continental Shelf) from July to December 2021. (n) total number of measured individuals.

European sardine (*Sardina pilchardus*)

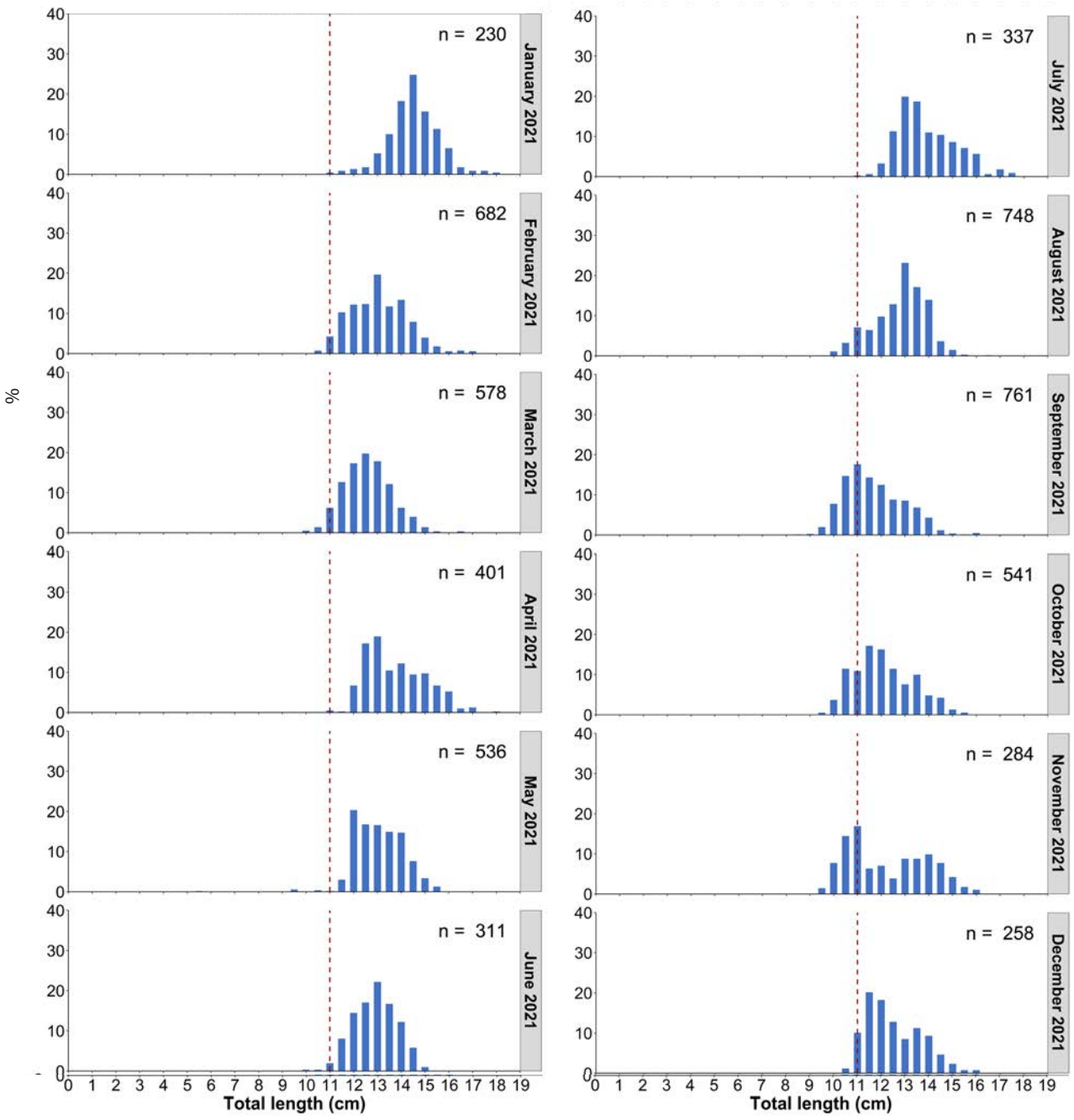

Figure 147. Monthly length-frequency distribution of European sardine from 2021. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) total number of measured individuals.

Anchovy (*Engraulis encrasicolus*)

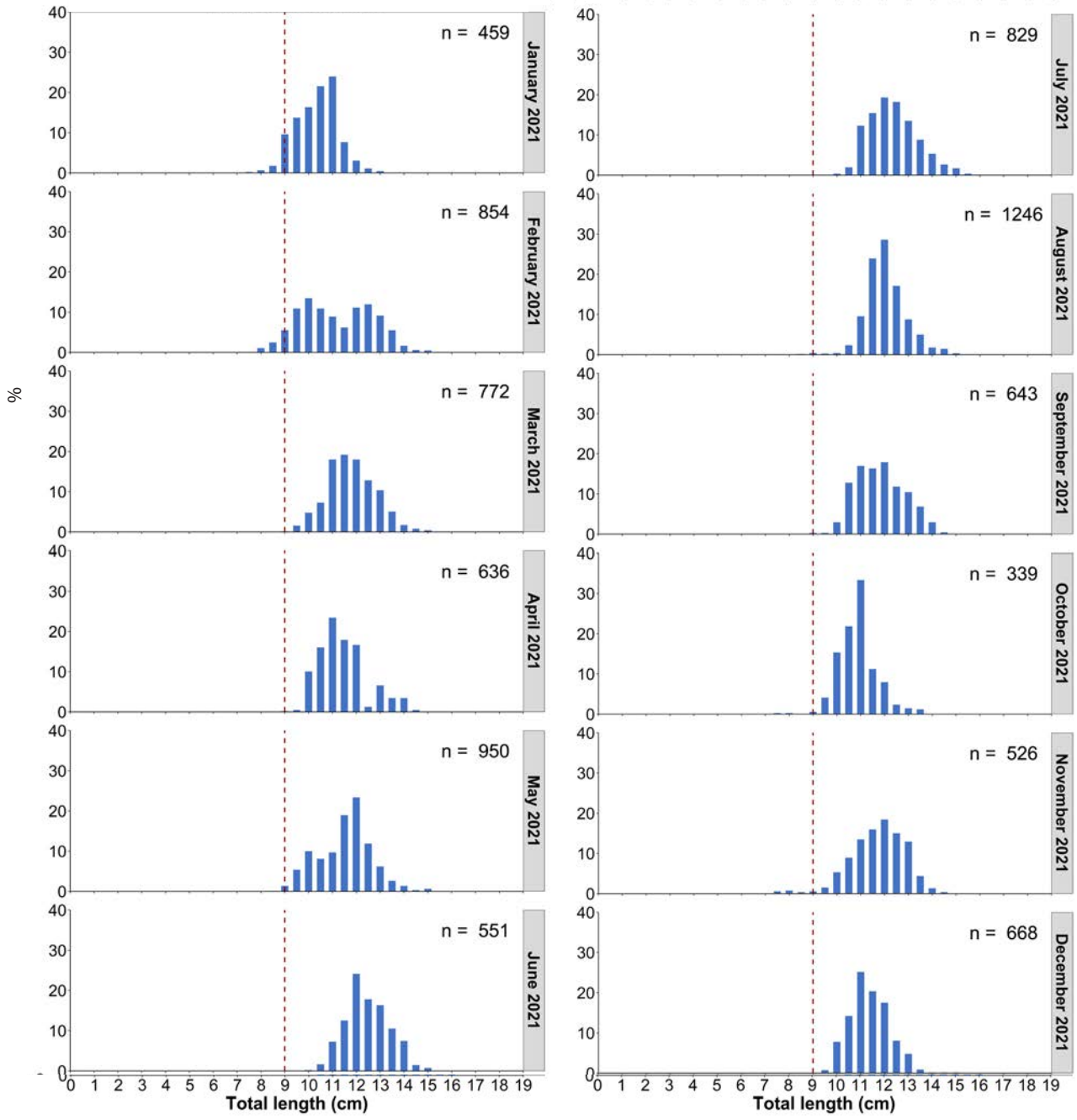

Figure 148. Monthly length-frequency distribution of Anchovy from 2021. Dashed red line indicates the MCRS (Minimum Conservation Reference Size). (n) total number of measured individuals.

Mediterranean sand eel (*Gymnammodytes cicerelus*)

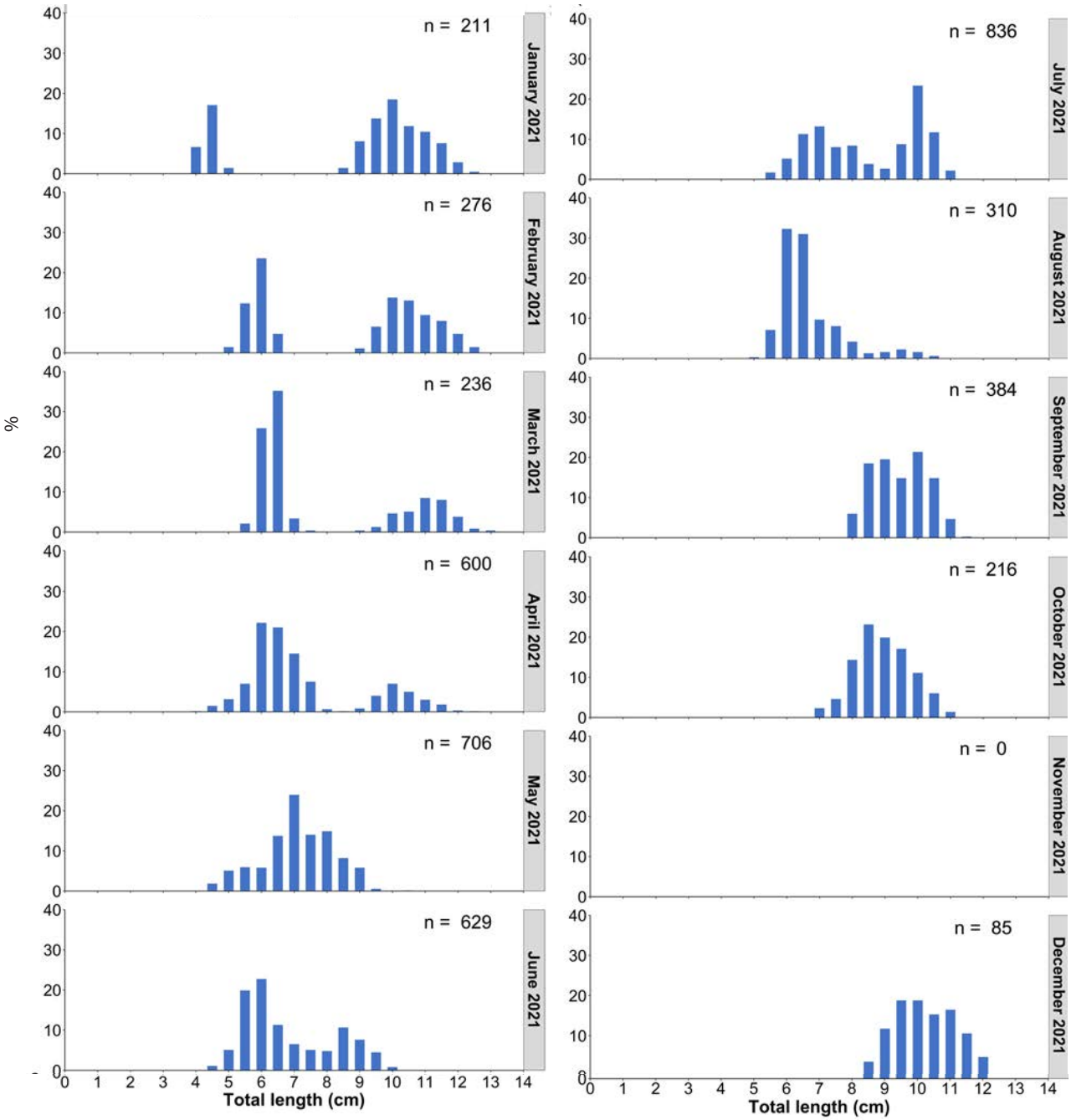

Figure 149. Monthly length-frequency distribution of Mediterranean sand eel from 2021. (n) total number of measured individuals.

Smooth sand eel (*Gymnammodytes semisquamatus*)

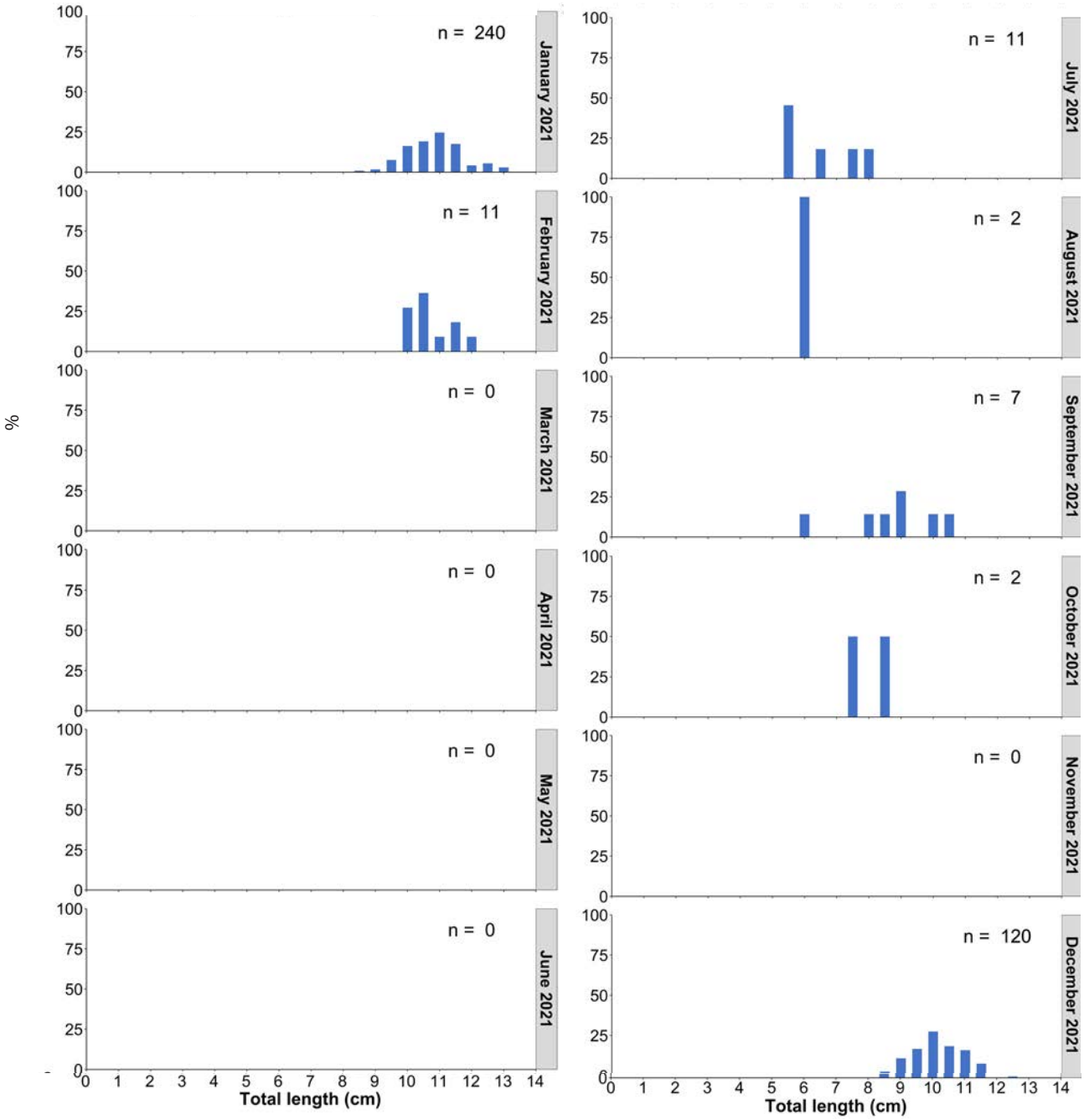

Figure 150. Monthly length-frequency distribution of Smooth sand eel from 2021. (n) total number of measured individuals.

Common octopus (*Octopus vulgaris*)

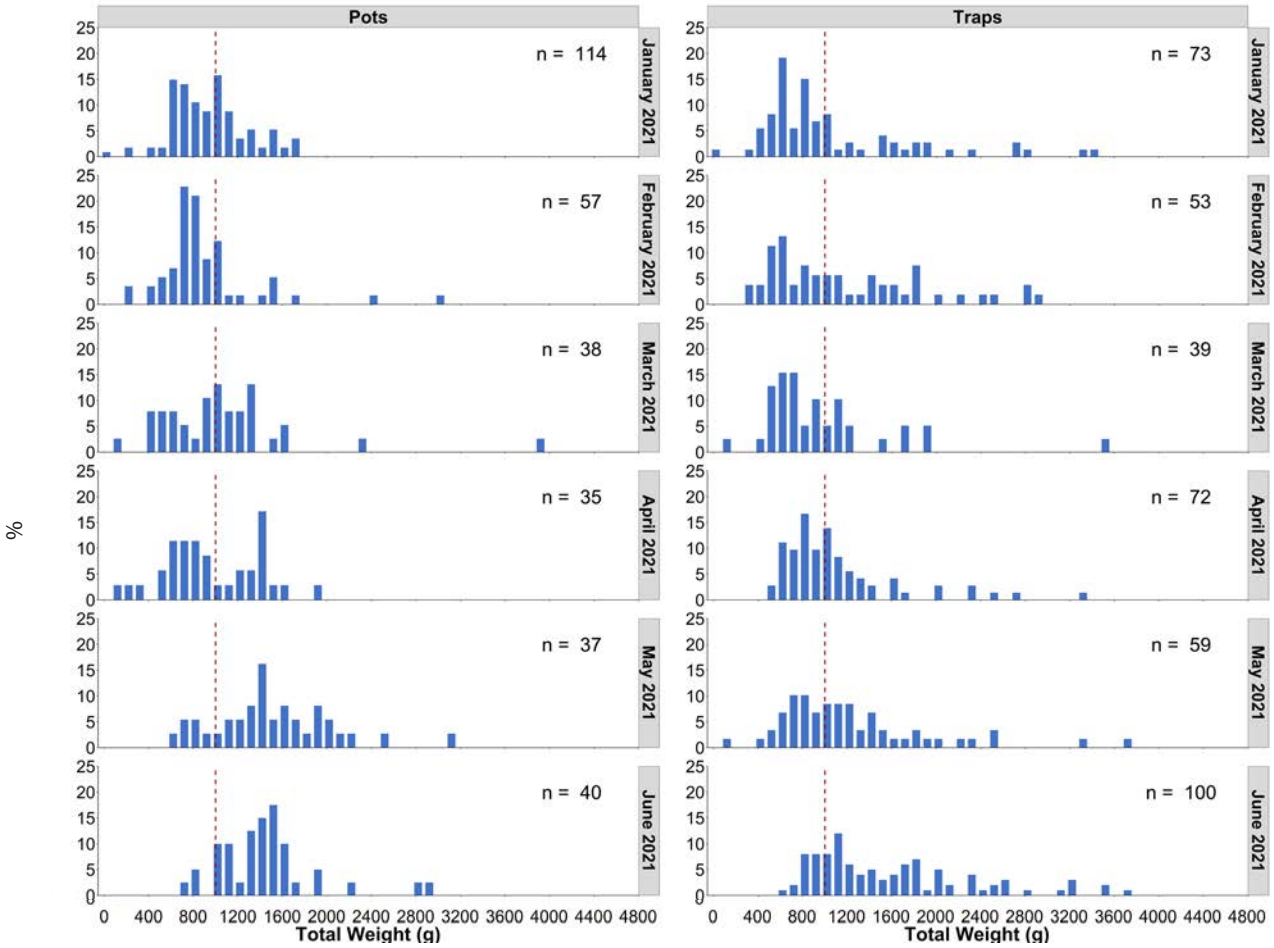

Figure 151. Monthly weight-frequency distribution of Common octopus from January to June 2021. Dashed red line indicates the MCRW (Minimum Conservation Reference Weight). (n) total number of measured individuals.

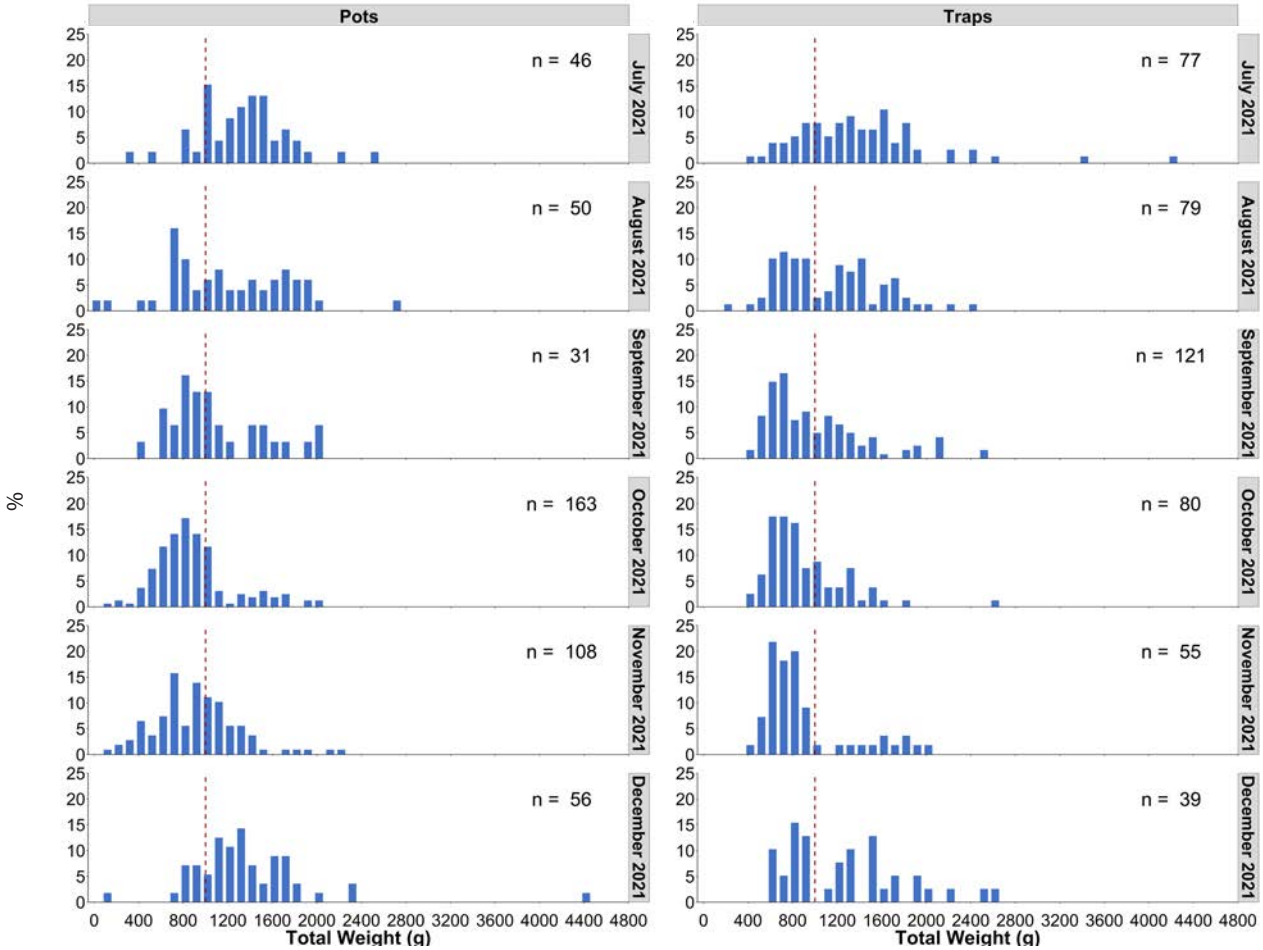

Figure 152. Monthly weight-frequency distribution of Common octopus from July to December 2021. Dashed red line indicates the MCRW (Minimum Conservation Reference Weight). (n) total number of measured individuals.